

How to grow the best
LAWN and GARDEN
in your neighborhood



how to grow the best

LAWN
and
GARDEN
in your neighborhood

A COMPLETE GUIDE TO GARDENING AND LANDSCAPING

edited by

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and

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Foreword . . .

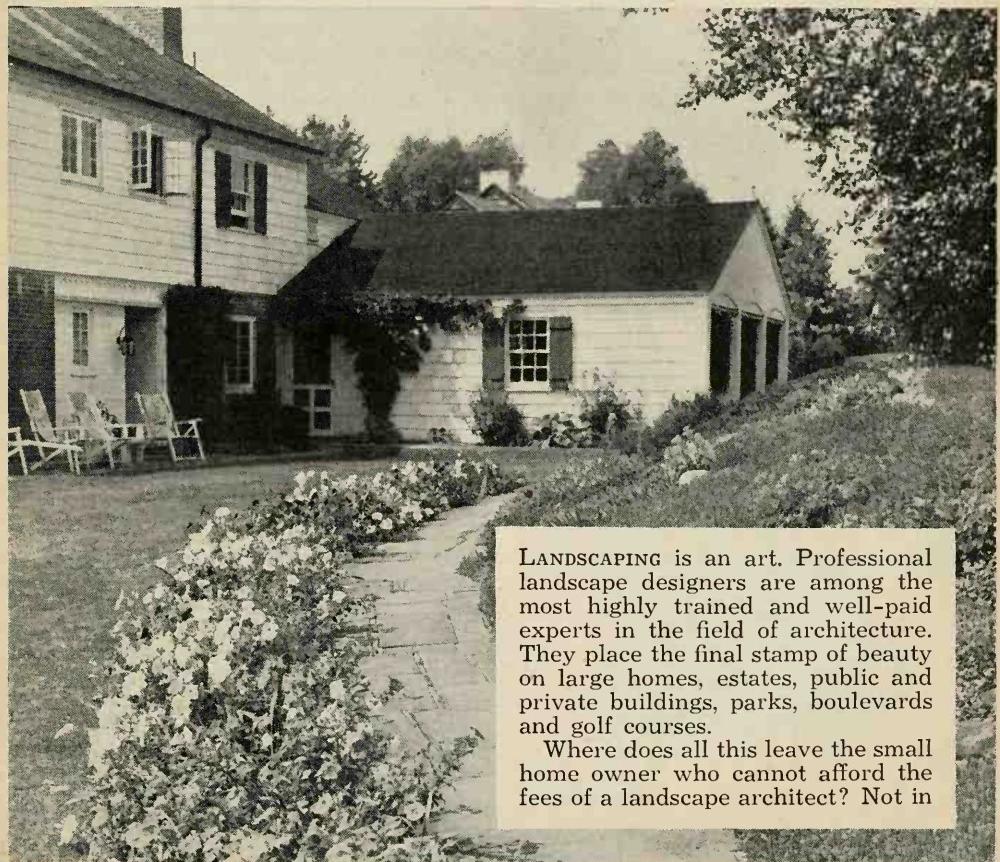
THIS BOOK is for the ordinary gardener . . . the kind of person who wants to make his home surroundings as attractive as possible without making gardening a backbreaking, all-engrossing project. Nevertheless, we have tried to give all the information needed for a beautiful lawn, sturdy trees and shrubs and bright-blooming flowers. We are firm in the belief that with this book you'll do much better with your gardening than you will following your instincts or the well-meaning but often dubious advice of others.

THE EDITORS



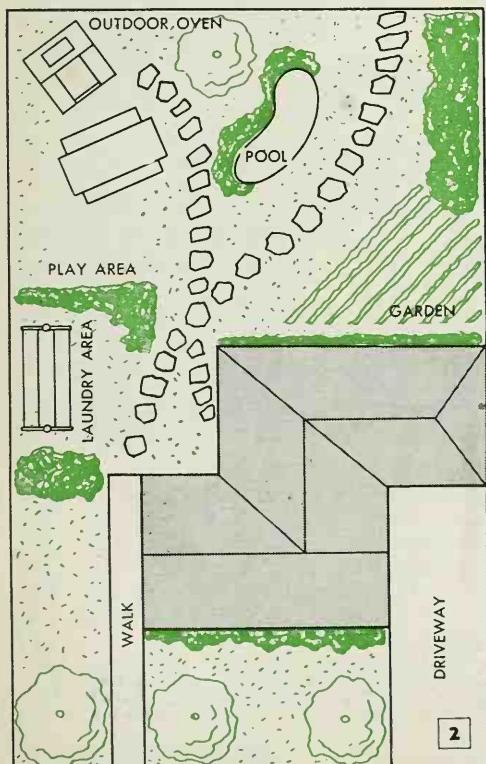
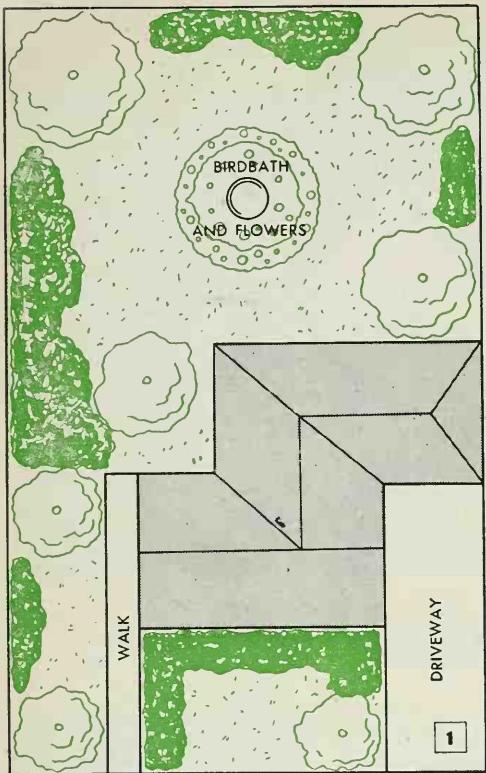
Charles G. Curtis Co.

Part 1 Home Landscaping . . .



LANDSCAPING is an art. Professional landscape designers are among the most highly trained and well-paid experts in the field of architecture. They place the final stamp of beauty on large homes, estates, public and private buildings, parks, boulevards and golf courses.

Where does all this leave the small home owner who cannot afford the fees of a landscape architect? Not in



too bad a position, really. Landscape artists are sympathetic with the desire of the average homeowner for beauty on his small plot of land. They have offered generous advice and counsel, and set down general rules for the guidance of gardeners who wish to apply some of the principles of landscaping.

Everyone at one time or another has noted the raw and ugly appearance of a newly built house. However charmingly designed, the beauty of the house is marred by the bare scarred earth around the house and the blank skyline about and behind it. Let a little grass grow, however, and let but a few trees and shrubs be placed about it, and the house immediately acquires the beauty its designer intended to be revealed. Only a little haphazard growth will achieve much. Think, then, how much more will be done for such a house if the landscaping is well planned and well carried out!

Landscaping has a twofold purpose. The first—beauty—is obvious. The second—utility—will become apparent upon examination. Every home needs different treatment because the people who live in it are different from their neighbors in more or less degree. One family has small children, and will want at least some part of the home grounds devoted to space for playground equipment. One family is intensely interested in gardening; another is only mildly so. There will be a vast difference in their landscaping needs. The family requiring laundry space will have a problem not faced by the family owning a mechanical clothes drier or using a commercial laundry. Outdoor laundry-drying space must be planned carefully so that it is conveniently at hand and yet not too obtrusive. It must be attractively screened by some kind of planting, so as not to become an eyesore.

It is good to think of the home grounds as an outdoor living room. In it you will want everything that interests you in gracious outdoor living. In a limited space there will have to be compromises. Mother may have to sacrifice part of her flower-garden plans to space for a shuffleboard court or an outdoor oven. Father's allotment for a vegetable garden may have to yield to the desire of other members of the family for a rock garden or a garden pool.

To reach a compromise in this conflict of interests, careful planning is necessary. This planning should be done in several stages. The first step is the drawing of a rough sketch.

The rough: Begin your landscape plan with a blunt black pencil and a piece of paper on which you have drawn the boundaries of your lot in proportion. Make this space as small as practical—say about 2 by

4 in. if your lot is 50 by 100 ft. This won't give you any room for details, which is a desirable limitation at this stage. What you want to achieve is the "large form," or the general appearance your landscape will present. This, in the end, will be a more important factor for pleasing or unpleasing results than any of the details.

Block in the space taken by the house, garage, walks, driveways and other permanent fixtures. The area that remains is to be divided into two parts—planted space and free space. The planted space is, of course, for trees, shrubbery, flowers and vegetables. Free space will be allotted to lawn, play areas, laundry space and for similar purposes.

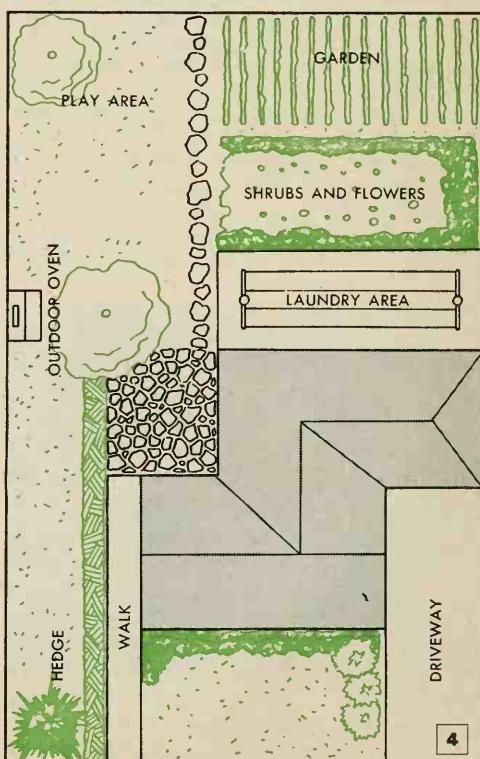
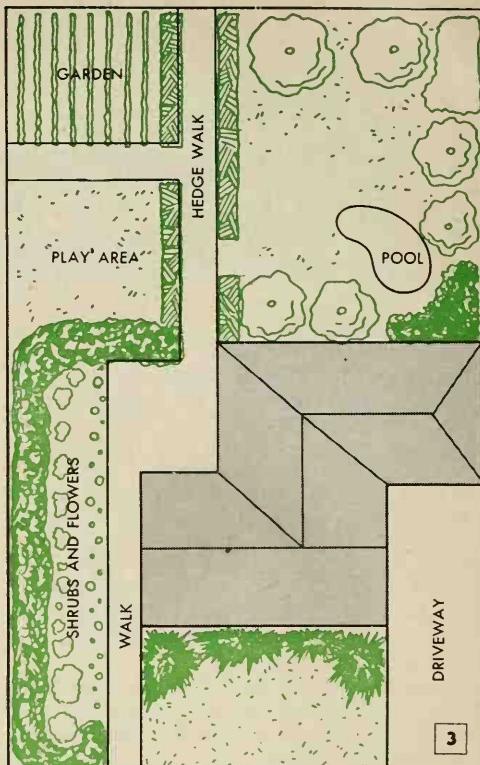
Using free movements (remember that here you can spoil only a small piece of paper), try to work out interesting shapes in and around the free space. Don't bother about professional landscape symbols—just use your own way of showing trees, shrubbery and other details.

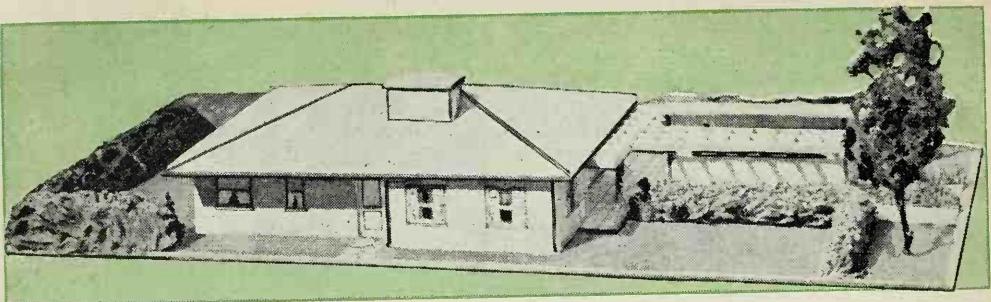
Once started, you'll make a lot of these sketches. They will be very revealing. They will show weaknesses and impracticalities in the ideas you may have had before you put pencil to paper. And, as your pencil moves freely within the sketching space, other ideas will come. Save all the sketches, as you probably will want to combine two or more in your final rough plan. Here's an important tip—don't use the boundaries of your lot as *landscaping* boundaries. The shape of your lot is a space *within* which you work and not *about* which you plan. Try to keep away from straight lines in planning shrubbery and other plantings. Nature never plants in a straight line. And there will be enough planes provided by house, walks, driveway, etc., to guard against the possibility of curves becoming monotonous.

The plan: Now you're ready to take your plan out of the rough stage and into details. And we hope, for the sake of final effect, that you resolve (and stick to it) not to depart from the general curves of your rough as you plot the details.

Figs. 1 to 4 show four landscape plans drawn about similarly sized and placed house plans. Each plan places different emphasis on certain areas, although there are points of similarity which are made necessary by the layout of house and grounds. The number of variations is practically limitless, and there is no reason for your home, even though it may be of the same design and material as every other in your block, to present the same appearance as any neighbor's house.

The formal plan will be larger than the rough sketch—a scale of $\frac{1}{4}$ in. equals 1 ft. is suggested. Make an L-shaped scale ruler





of a strip of heavy cardboard, marking both arms of the rule in feet at $\frac{1}{4}$ -in. intervals. This rule will enable you easily to mark off space in square feet that you intend to devote to certain areas. Again block in the buildings, walks and drives, and outline the lawn space and other open areas with light pencil lines. Make your house plan detailed, with rooms, porches, doors and windows indicated, so that you can plan plantings near these carefully. Now treat each special area of planting space individually. You can forget about the whole plan now, since your rough sketch has assured the over-all effect.

In working out details within an area, remember that balance is wanted, but also that good balance is not always obtained by mathematical precision.

Planting trees in front of a picture window, for instance, does not mean that two trees of equal height should be placed at exactly located spots on either side, with a uniformly spaced line of shrubbery between. Two or three trees at one side of the window, with a shrubbery mass curving before the window and sweeping to meet a porch column, will provide more pleasing balance.

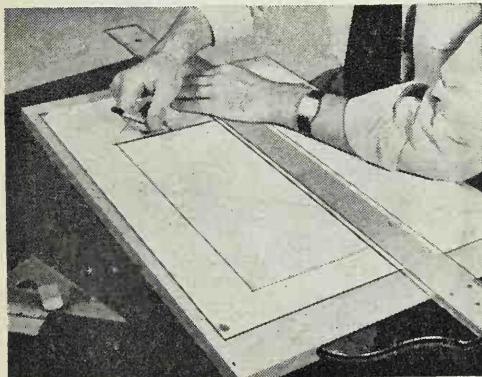
Shrubbery is more attractive in varying masses than in straight rows of uniform

height. Two or three varieties of shrubs are better than a single kind if their shapes and textures harmonize. Choices for planting will be given later, but the way in which plantings are massed should be given some attention on your scale plan.

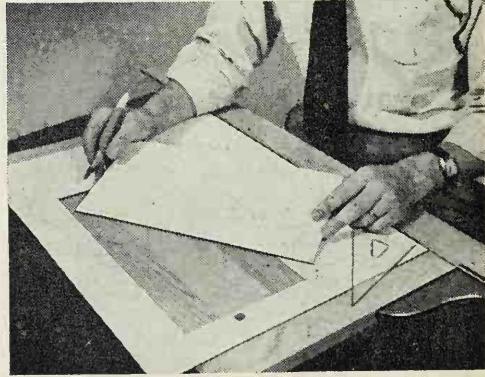
The model: You can, of course, proceed directly from plan to planting. But professional landscape artists recommend one more planning step—the construction of a scale-model house and grounds. A scale model gives a much more realistic forecast of the final effect than a two-dimensional plan, and may reveal defects in the original plan that will save you money.

To lay out a plan accurately to scale you will need a draftsman's T-square, a 45-deg. triangle, a pair of dividers, a small drawing board, thumbtacks and a triangular scale showing common scale reductions.

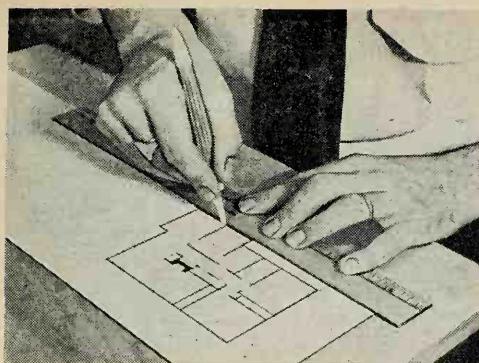
Begin by thumbtacking a piece of illustration board to the drawing board. Then, with the scale, lay out the size of the lot, using a scale of $\frac{1}{4}$ in. equals 1 ft. For some types of construction a scale reduction of $\frac{1}{8}$ in. equals 1 ft. is practical. Mark the property boundaries on the board. Then, using the same scale reduction, lay out the floor plan of the house on another sheet of illustration board. Scale the thickness of the walls and mark the inside over-all di-



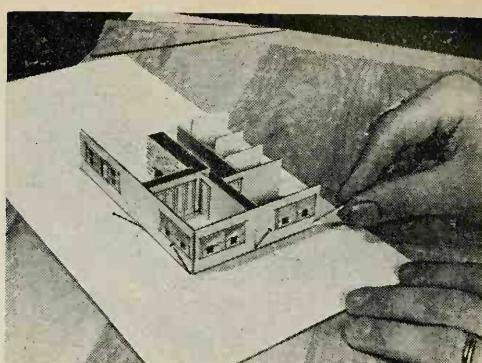
Lay out the exact scale size of your lot on heavy illustration board and mark boundary lines in pencil. Use the common reduction of $\frac{1}{8}$ or $\frac{1}{4}$ in. to 1 ft.



Cut out the lot, using a metal-edged ruler and a sharp, thin-bladed knife. Hold the blade in a vertical plane so the edges of the board will be square on all sides.



On another board lay out the house plan. Mark the partitions. Plan should be an exact scale reduction of the inside dimensions measured from wall to wall



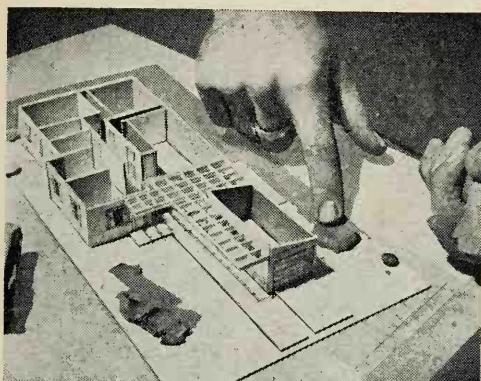
With walls and interior partitions cut to scale, the model may be assembled. Hold walls with pins while joining the partitions with airplane cement

mensions of the floor plan. Then cut on the inside lines. Cement this cutout in place on the plan of the lot in exactly the same location as the full-size house is to be. This method of cementing the floor-plan piece to the board on which the lot plan is laid out makes it easier to position the walls. Use your T-square and triangle to get parts laid out exactly at right angles and be careful about the measurements.

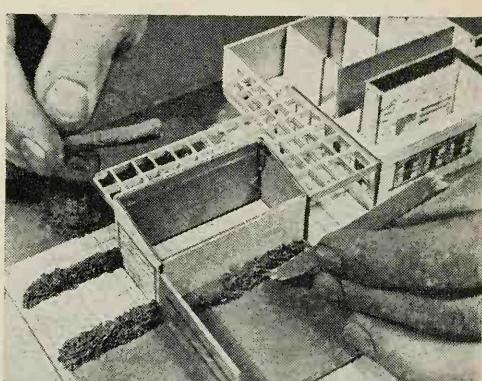
Next, determine the scale height of the outside walls and partitions. Mark off and cut strips of the illustration board so that you can cut pieces of partition and wall stock as required. Scale-sized windows and doors are represented by drawing the outlines directly on the walls with black ink, or with pencil. Assemble the parts and fasten them together with airplane cement, reinforcing the outer walls with common pins. On most plans you can cement all the partitions in place before setting the outside walls. At this stage, with the exterior walls in place, cut a ceiling piece of the exact outside dimensions of the floor plan so that it overlaps the thickness of the walls on all

sides. This gives you a foundation on which to build the roof. If the house has a boxed cornice, then the ceiling piece should extend beyond the outer walls a scale distance equal to the overhang of the cornice. Build the roof in sections, using small blocks of wood to elevate the sections to the correct pitch. Carve the chimney top from a small block of wood to scale size, score it, or line with ink to represent bricks, and cement it to the roof. Finally, cement the model house in proper position on the illustration board. Next, make and place the garage if this is separate from the house.

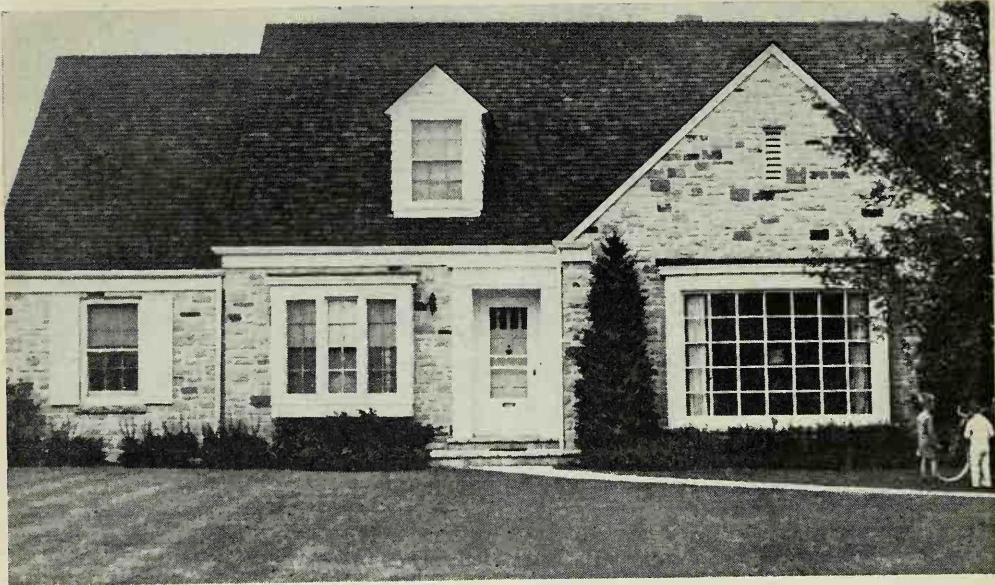
Cut green blotting paper to represent the open lawn areas of your landscape. Cement this in place. Hedges and shrubs can be worked out to scale with green modeling clay. Use crumpled colored crepe paper to represent flower beds. Trees can be represented by tiny artificial trees such as can be obtained in any dime store, or by sprigs of evergreen. Trellises, archways and fences may be carved from pine or balsa wood. Walks, drives and other concrete surfaces will be represented by the white



Colored modeling clay is used to form shrubbery and hedges. Strips cut from a sponge also can be used



Finishing the modeling-clay shrubbery with the splintered end of a stick gives a realistic effect of foliage



Here trees and shrubbery have been combined to set off the house without spoiling architectural details

unadorned area of the illustration board.

Paint the model house and other appropriate parts of the layout with painter's oil colors thinned to an easy brushing consistency. Use soft-bristle brushes to spread the paint in a uniform coating on the smaller surfaces.

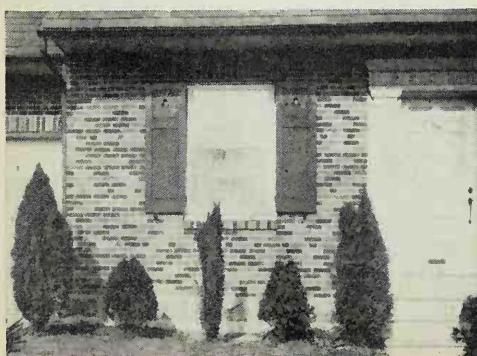
The scale layout may seem to be a lot of trouble. But it can be a lot of fun, and may save you some unpleasant shocks in the future. Don't forget to make your pieces scale correctly in height as well as in length and width.

Trees should be the first concern of your landscape plan. Trees will frame your picture, and can ruin it if located incorrectly. A small ranch house, for instance, will be dwarfed and its pleasing rambling effect destroyed by plantings of Lombardy pop-

lars that eventually will grow to 70 ft. or higher. Smaller trees, placed advantageously, will make the house appear larger than it is. The shapes of trees also will have an important over-all effect on the picture. With a tall, narrow house, a broadening effect should be sought for in the over-all landscape plan. Trees of rounded form, in plantings leading the eye away from the corners of the house, will achieve this.

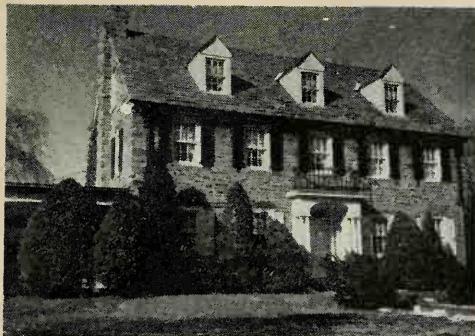
Tree shapes generally fall into one of the following classifications: pyramid, inverted pyramid, oval, columnar and clump. Pyramid trees include the cedar, fir, hemlock, pine, spruce and larch. Inverted pyramid shapes are assumed by the elm, honey locust and Japanese pagoda tree. The oak, maple and tulip are oval-shaped trees. Trees of the columnar type include the

Doorstep plantings must be chosen with care. Plant trees that will spread, rather than attain height



Paul Hadley





For the formal house—formal plantings. The several kinds of evergreens here have been trimmed to shape.

Lombardy poplar, cypress and eucalyptus.

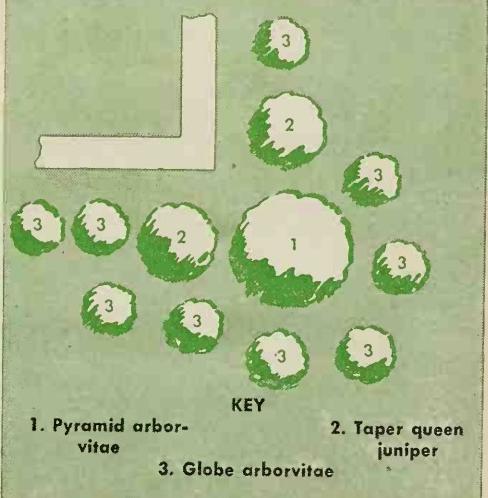
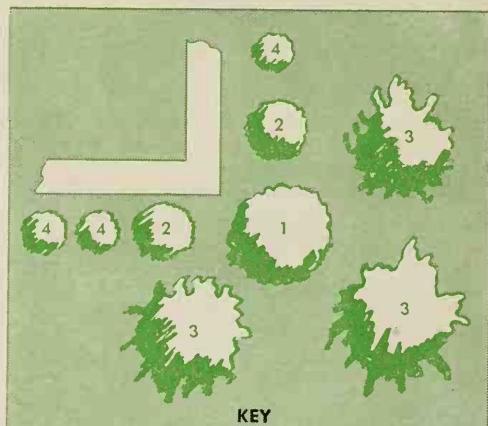
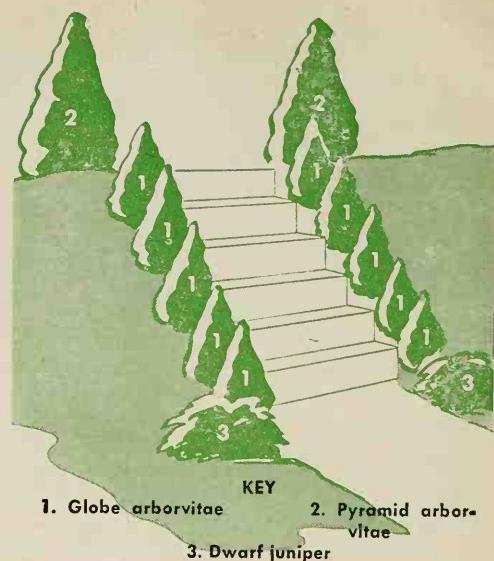
Clump trees are those which naturally grow with multiple trunks, or in close-growing groves, such as the birch, ash and willow. In addition, there are trees which are especially suited to being trimmed into fancy artificial shapes, such as the laurel, linden, plane and horse chestnut.

The shape and the eventual size of the mature trees will determine the general effect and character of the landscape picture. Be careful to allow for future growth, so that the trees will frame the house and not hide it. Locate the larger trees near the rear corners, so that they will extend their branches above the house, softening the harsh lines of roof and corners and showing the home to advantage. Trees should always appear to be associated with some other part of the grounds—either the house, other trees or a shrubbery mass. Landscape artists rarely put a lone tree in the center of open lawn.

Trees fall into two main groups—deciduous and evergreen. Evergreens keep their leaves or needles during winter, so that a continuously green foliage is maintained. But they present a cold and formal appearance in spring and midsummer, when other plantings are brilliant with blossoms and sparkling with foliage. So it is doubtful that you will want to confine your tree plantings solely to evergreens.

Most of your plantings should be native trees. This is important because native trees are used to the soil and climate of the region, and because they are less expensive. By keeping a lookout along the highway or in the woods, you can often find good specimens suitable for transplanting to your grounds in early spring or fall. (Don't be guilty of trespassing on private land or of robbing state preserves.)

With these general matters in mind, you are ready to choose your trees. A list of suitable landscape trees and a description of their properties starts on page 72.





When making a landscape plan, number the duplicate shrubs of a given variety. Where there are duplicates in a single group or in adjacent groups, it's quite important that the duplicates be of the same age and training

Shrubby plantings not only add materially to the value of any home, large or small, but they give it that natural appearance so difficult to achieve in any other way. In making a selection for a given location, keep in mind the exposure, type of soil, appearance, and especially the spread and height of the shrubs when they have attained maximum growth. In some locations and for certain specific purposes, the relative rates of growth of a group of shrubs must be considered in the planning. Most of the extremely hardy shrubs grow very slowly, taking years to attain maximum height or spread. Others grow rapidly, taking only two or three seasons to reach tree size from a single nursery "whip." Certain varieties of slow growers have been designed by nature to withstand very severe cold without harm and without any additional protection. Some thrive in exposed positions in thin soils, while other more tender plants require sheltered locations and moist soils rich in plant foods. This wide variety gives you a choice of plants with size, color of foliage and bloom, and growth habits suitable for almost any plan, location and climatic conditions.

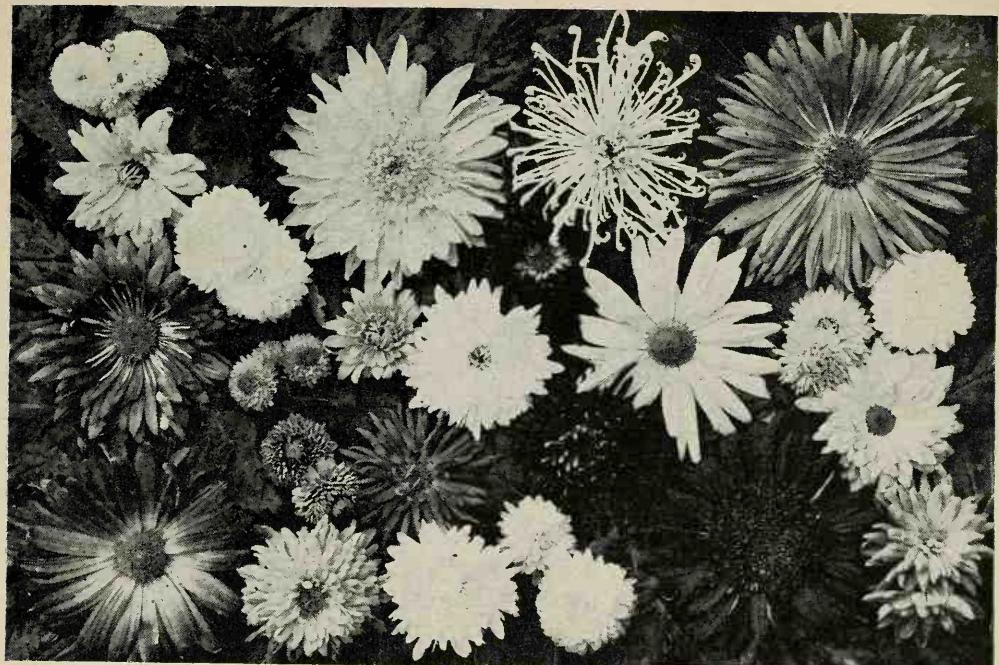
Corner plantings, using both tall, conical

shrubs and the low-growing types, which spread a thick foliage only a few inches above the ground, are especially effective around small homes. Plan views of such plantings are shown in the keyed drawings. Usually, tall-growing shrubs are planted in the background and the lower varieties in the foreground in those arrangements where close grouping is necessary. Where shrubbery borders a walk, driveway or a terrace stairway, those bordering the stairway should be of the low-growing varieties, all specimens being of equal age at the time of planting. Where the stairway leads from a lower to a higher level of the garden or lawn and not directly into the house, the lower-level terminal planting usually is a low, spreading evergreen, the spreading junipers being especially suitable. At the top of such an arrangement the stairway row planting may properly terminate in a single taller specimen on each side. When making any closely grouped planting requiring the use of duplicate specimens, be sure that the duplicates are of the same age.

Border plantings, on the other hand, should not achieve the more geometric symmetry required near a building. Instead they should show the rambling out-

In corner plantings, left, low-growing shrubs with thick foliage ordinarily are planted in the foreground. Right, formal plantings require regular seasonal care. Trimming must be done repeatedly as growth progresses





Totty's

Above, a one-plant garden of assorted chrysanthemums. Below, a bed devoted entirely to floribunda roses

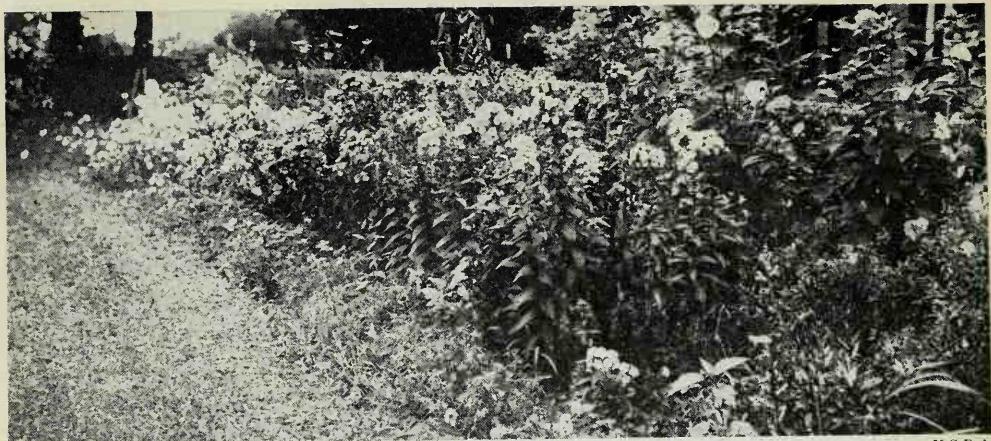
line often found in natural surroundings. The one exception, perhaps, is a hedge which also serves as a boundary between two properties. Here the planting may consist of individuals of a single variety of the same size and age, or two varieties of contrasting foliage if there is room.

It pays to buy balled stock for both individual plantings and also for the larger specimens in a group planting. Balled evergreens should be at least three years old. The five-year specimens of most varieties of evergreens cost more but these have had the benefit of two or three years' training in the nursery.

Smaller specimens dug from the nursery row are supplied with open-root systems packed in damp moss. These should be handled with the greatest care after unpacking to prevent the roots from drying out before the shrubs can be planted in a permanent location. If there are a number of shrubs such as a single lot of one variety for a long hedgerow, all those which cannot be planted immediately after unpacking should be "heeled" into moist soil. To do this dig a V-shaped trench in the garden and lay the shrubs side by side against one side of the trench with the roots at the bottom. Cover the roots and trunks some distance above the ground line with soil and pack it lightly. Soak the trench thoroughly. When you remove the shrubs from the trench, or the original packing, place the roots in a pail or tub filled with water.

J. Horace McFarland





U.S.D.A.

Tall flowers can be blended effectively with a hedge to make a colorful background for informal gardens

A list of shrubs suitable for home grounds will be found on page 87. Planting instructions are on page 83.

Flowers are the jewels in the setting provided by your trees and shrubbery. One important fact should be grasped by every home landscape designer—flowers have a place in every part of the home grounds, but they must be wisely selected and properly located to give the most pleasing effect. At the front of the house they should be used for foundation and shrubbery plantings. Almost never should they be placed in a bed in the middle of the yard. At the front, flowers are especially useful during the early days of a landscape. Use them to fill the bare spaces around and between plantings of shrubbery, which often are thin and ragged when new. Most flower plantings in the front should be those of long-season blooming habits, with a few tulips, daffodils and crocuses for early spring, and a few late flowers such as chrysanthemums for late fall. This will provide color for your front from early spring to the onset of winter.

You will use flowers sparingly in your front yard, but in the back you may splurge with blossoms. Plan your beds formally or informally according to the general theme of your landscape plan.

Formal balance is achieved by a geometric layout of beds or pathways between beds. Plantings should be balanced on either side of an imaginary center line through the whole garden area. An informal garden can be an irregular border containing masses of varieties of flowers which are backed up by a shrubbery border or a boundary fence. A massed flower garden should be near the living room of the house or an outdoor terrace. This will add greatly to the beauty of the surroundings. If the land area is large enough, several flower

gardens may be planted. That nearest the house can be formal while those at greater distances can be informal. The shape of a flower garden is most pleasing when it is a little longer than wide (about one and one-half times the width). But longer rectangles, or even a square, can be made interesting with a little planning.

Use low-growing flowers to border walks and the open boundaries of a lawn. Use of flowers here is much better than the common practice of spading out the grass and leaving raw, open trenches at the sides of walks. Border flowers can also be combined with shrubs, either by planting the flowers in front of the shrubs or devoting sections of the shrub border to flowers.

Tall-stemmed flowers, such as the castor bean, cosmos, sunflower and basketflower, can be used as screens for temporary fences, or to hide rubbish burners, garbage cans and other unsightly objects.

The simplest garden to design and maintain is the one-plant garden. This may be a rose garden, an iris garden, a zinnia garden, a petunia garden or any one variety. Equipment, garden practices and controls can be standardized in a one-plant garden.

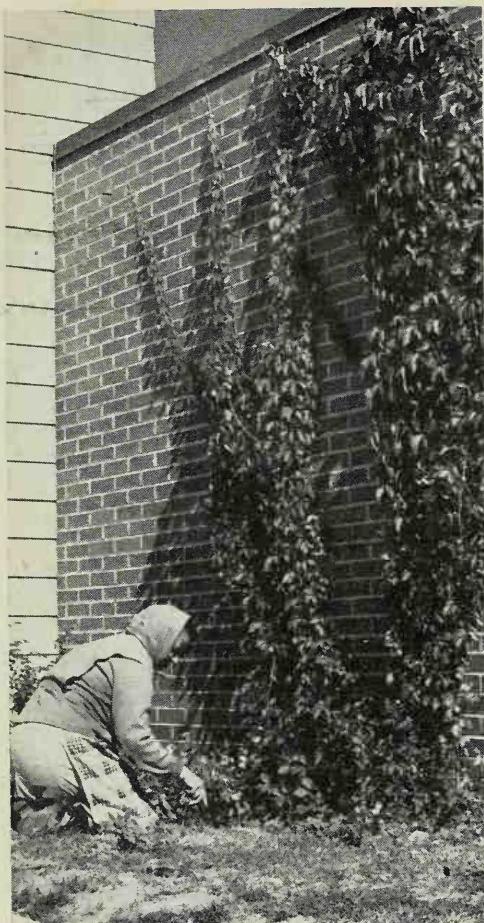
The one-color garden is a popular idea among home gardeners. Is blue your favorite color? Imagine, then, the pleasure you'll get from a flower bed the edging of which begins with pansies, violets and forget-me-nots, which rises in the middle ground to bachelor buttons, cornflowers and columbines and is topped by tall sweetpeas, delphiniums and asters. Or visualize multi-shades of yellow made by California poppies, dwarf marigolds, strawflowers, double buttercups, dahlias, nasturtiums and black-eyed Susans.

You should plan a separate area for cut flowers for indoor decoration. The grounds which do not furnish beauty for the home



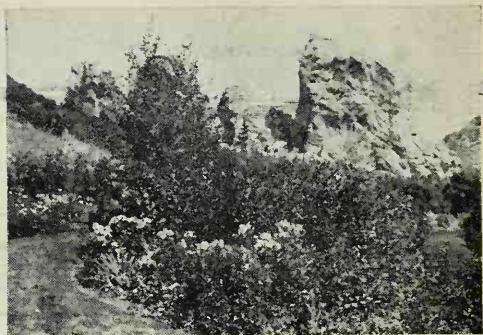
National Garden Bureau

Flowers for cutting grow best in the vegetable garden. They also add beauty to these plain surroundings



Washington Commercial

Climbing vines add charm to any garden plan. They are especially useful for breaking up wall expanse



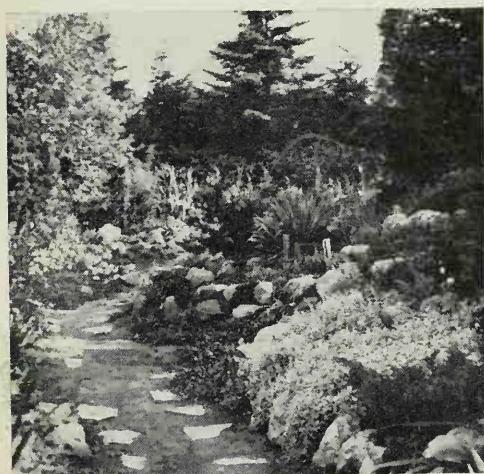
U.S.D.A.

Take advantage of nature's oddities. Here a large rock has been left to set off shrubbery plantings

interior are performing only half their function. The vegetable garden is an ideal place for growing cut flowers. The cultivation and plant food which a vegetable garden receives also makes flowers grow better. Another argument for a separate area for cut flowers is that the beauty of the decorative garden and border plantings may be destroyed by cutting blooms for the house.

Other landscape areas: With all the "greens" in your landscape picture taken care of, you are ready to plan in detail the other areas of your home grounds. A close budget may not permit the completion of all your wants within a year or two, but sooner or later you'll want to add lawn furniture, some garden ornaments, perhaps some playground equipment or possibly an outdoor kitchen. You'll have to decide whether you want flagstone walks or a grass path in and around your flower and vegetable gardens. Whether you want a fence or not will depend on whether you actually need one to confine pets or small children and on whether it will or will not add beauty to the grounds. On small lots, landscape gardeners sometimes are reluctant to recommend a fence unless it is a prime necessity. You may want to build a rock garden or a garden pool. There will be spots on your ground which can be enhanced by trellises and pergolas, although care must be taken that these garden furnishings are not overdone. If they are, the whole landscape scheme can be made to appear in extremely bad taste. Remember that outdoor cooking areas and game courts get hard use—for the sake of the rest of your lawn you'd better plan to pave these areas in concrete, asphalt, gravel or tanbark.

Plans and instructions for making a number of such outdoor furnishings are contained in Part 5 of this book. Before starting such a project, however, make sure that its dimensions and general appearance will blend into your landscape plan.



U.S.D.A.

A flagstone walk flanked by flowering shrubs leads to a rock garden. The treatment here is informal

Part 2



Preparing the soil . . .

National Garden Bureau

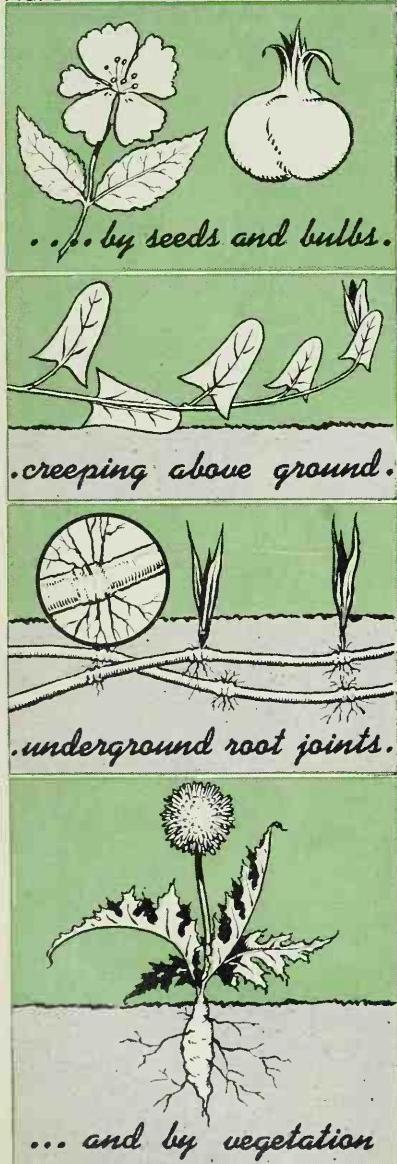
THERE'S A LOT OF WORK to be done before you plant that first seed. On the care with which you prepare the ground depends to a great extent the ultimate success of your lawn, your trees and shrubbery, and your flower and vegetable gardens. Soil preparation includes ridding the ground of weeds, analyzing the soil for correction of its chemical makeup and proper cultivation. All these matters will be discussed in this section from the standpoint of plots which have never been planted before and of grounds which need redoing.

FIG. 2



How Weeds Spread

FIG. 1



Getting rid of weeds ~~~~~

IF THERE IS DOUBT in anyone's mind that weed destruction is a necessary function, it will be useful to reveal the misdeeds that these garden pests accomplish if allowed to flourish. When weeds are allowed to survive alongside the plants in your garden, you will find that there will be competition for food and moisture which will cut down on the yield of the desirable plants. Various diseases find weeds to be hospitable hosts on which they develop and then move on to other plants. Insects also find shelter and food in weeds which they use as bases from which to multiply and attack the desirable plants. The job of growing grass, flowers and vegetables will be more laborious if weeds are allowed to get in your way. Most obvious of all is the undesirable appearance of weeds, which decreases the value of your property as well as that of the community.

Kinds of weeds: Weeds are of three general varieties—annual, biennial and perennial. Each of these types calls for different means by which it can be destroyed, and an examination of the nature of these weeds will explain why this is the case.

Weeds of the annual variety complete their life cycle in one year, while the biennial weeds produce vegetative parts during one season and bear seed for the following year. Perennial weeds, on the other hand, have underground parts which live indefinitely and produce seed every year with the exception of the first.

Weeds spread over large areas by several natural processes (Fig. 1), which will have to be taken into account in finding the solutions to weed eradication. Perennials, such as wild garlic and others, reproduce by seed and by bulbs; others, such as chickweed, by creeping above ground, still others by new growth from underground root joints. Johnson grass and quack grass perpetuate in this manner. Dandelion and others reproduce by seed and by root growth. The latter method of perpetuation takes place when a root section is cut away in some manner, such as by hoeing, disk harrowing or plowing. This piece, although cut away from the plant and perhaps carried some distance, sends out roots and stems and thus establishes itself as a new plant. Roots of some of the rapidly spreading perennial weed pests, such as bindweed, have been found to extend as much as 25 ft. into the subsoil.

Weed-cutting tools: Because of their respective characteristics, it can easily be seen that ridding your property of annual and biennial weeds is a simpler matter than permanently destroying perennial weeds. One way of controlling annual and biennial weeds is to prevent their going to seed by cutting the tops close to the ground when the weeds have reached maturity. An instrument such as the one shown in Fig. 3 will accomplish this task. However, an even easier way to rid your property of weeds is to catch them in their sprouting or young seedling stage, at which time they can be uprooted easily with little disturbance to the topsoil. When the young and tender roots are exposed to the sun and air, they will shrivel and perish within a matter of minutes.

There are a number of different kinds of weeder, each good for its respective purpose. Steel garden rakes, rake attachments of a wheelhoe, horse or tractor-drawn weeder, hand instruments resembling claws and hooks, knives bent in different forms and a sharpened outer tooth of a cultivator are but a few types of instruments used for weeding. You can even improvise your own weeder by cutting off the ends and truing the bottom edge of an old garden hoe (Fig. 6). This improvised tool is particularly good for weeding between closely spaced rows of vegetables. Figs. 4, 7 and 8 will give you an idea of the types of weeder from which you can choose for your own purposes.

Another useful garden implement is the spud, Fig. 5, which can be used to destroy individual weeds by cutting the roots several inches below the surface of the ground. The roots should first be severed underground before the plant is pulled up. This operation should be performed as

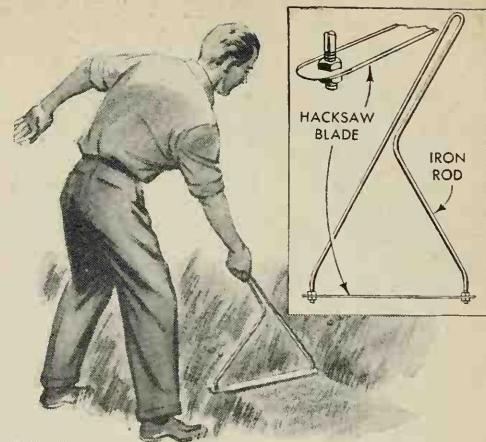


FIG. 3

This weed cutter is made from a power-hacksaw blade and a length of iron rod. The teeth of the blade are ground off and both edges are sharpened. The rod is bent as indicated in the upper right-hand detail and the blade is locked in place with two nuts on each end of the rod. The rod is threaded to fit the holes in the ends of the hacksaw blade. In using the cutter, a long sweeping motion is made

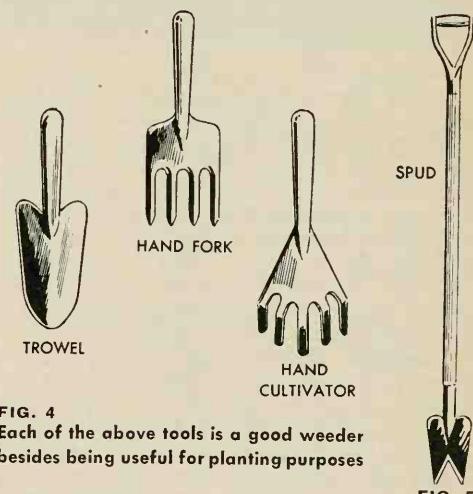


FIG. 4

Each of the above tools is a good weeder besides being useful for planting purposes

FIG. 5

The spud cuts roots below the surface of the ground

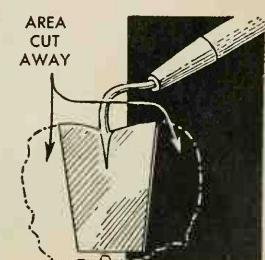


FIG. 6

By cutting off the ends and truing the bottom edge of an old garden hoe, you can improvise a weeding tool. Cutting can be done with a hacksaw or cold chisel. Sharpen the lower edge of the hoe for effective use of this tool



FIG. 7

A cultivator with a sharpened outer tooth makes a good weed cutter. This implement is especially effective in cutting deep-rooted weeds along a row of vegetables. The tooth can be easily sharpened with a file

early as possible and especially before the plant reaches blossoming stage. For once the plant has blossomed, there will be the newly sown seeds which will grow more weeds to contend with.

Burning: Weeds can also be killed by burning them with a gasoline or kerosene torch which throws a strong hot flame. One burning will destroy the annual and biennial weeds, but two and even three burnings will be required to eradicate perennial weeds permanently. The flame should be applied to the ground around the weed long enough to heat it properly; weed seeds will also be destroyed this way. You can obtain the best results by using this process when the ground is absolutely dry.

Chemical sprays: The permanent destruction of perennial weeds presents a difficult problem, but one which can be solved if approached correctly. Cutting the tops of these weeds to prevent the sowing of seeds will handle the problem for only one season. Once these stubborn plants get a good foothold in your soil, they can be eliminated only by destroying their underground root parts. Suggested ways in which to do this are as follows: by exposing the roots to the sun, air or frost; by chemical treatment; by choking them with a smother crop, and by preventing their green parts from developing and thus starving them.

Getting the roots of deep-growing weeds out into the open is a difficult matter, especially if they extend as far as 25 ft. into the subsoil. Uprooting a plant of this sort is impractical. An effective alternative is to mix a solution according to simple direc-

tions and spray them (Fig. 1)—that's the new, sure way to kill weed pests on your property.

The powerful herbicides which have been developed not only kill common weeds but also take care of such persistent perennial pests as poison ivy, poison oak, bindweed, dandelion, ragweed, plantain and many others of wide distribution. Many of the new chemical killers are selective in action, which means that under favorable conditions certain weeds can be killed in a field of growing grain without damaging the crops, and dandelion plants can be eradicated from lawns without injuring the grass. Moreover, certain of the chemicals do not act as soil sterilants when applied as sprays in the solutions recommended for garden purposes. Others are only temporary soil sterilants, the time varying with the soil. Most of the solutions are free from fire or explosion hazards, many of them actually possessing fire-resistant properties. Residues from the spray solutions have not been found harmful to humans or animals. Some of the solutions have a slow corrosive action on galvanized metals; others do not. In any case it's always best to wash out the sprayer with soap and water or kerosene after such solutions have been used. If the same sprayer is used for applying insecticides to plants and shrubs, all traces of the weed-killing chemical must be removed.

Certain solutions of the selective weed killers administer a knockout punch to even



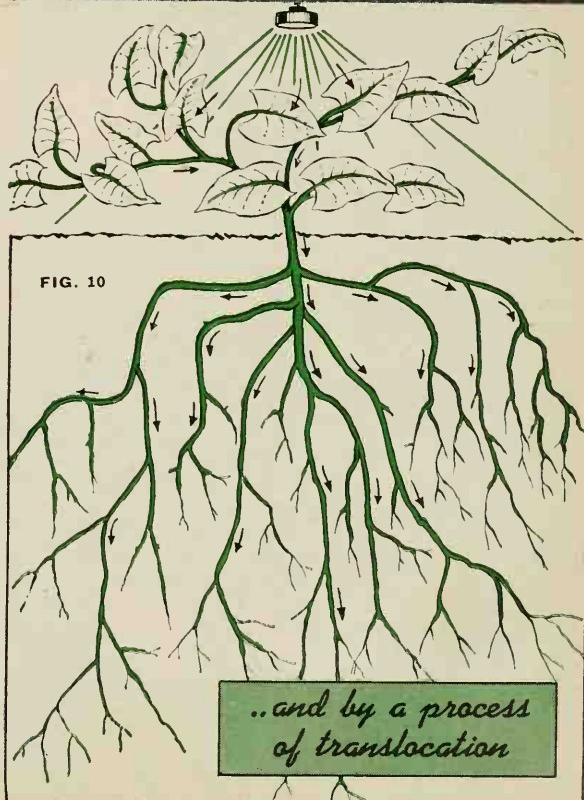
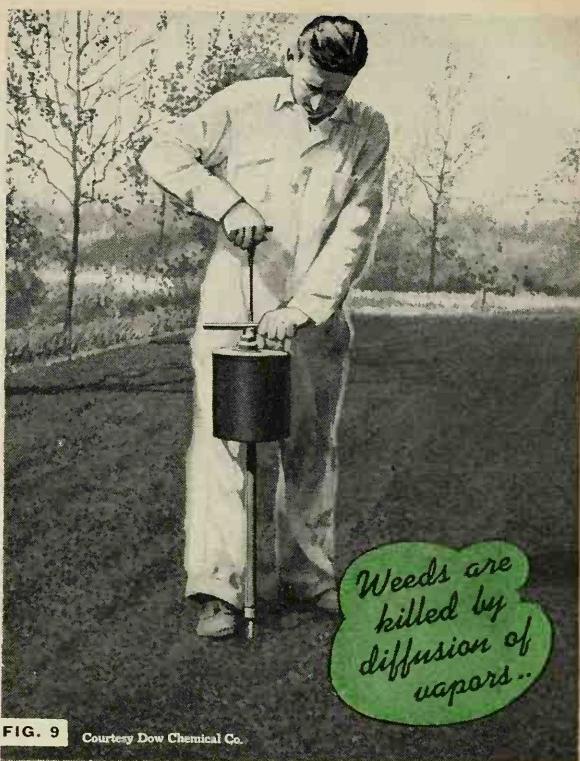
FIG. 8

A garden hoe with a V-notch cut in one side of it and both edges sharpened chops tough weeds. Cutting action is improved by the two sharp edges forming the shape of a V. The weed will not slip out of the notch

the most hardy weed pests of both the deep and shallow-rooted varieties. After the chemical has been applied as a solution to the foliage by spraying, or, in some cases, simply by sprinkling, it not only kills the plant tissues with which it comes in contact but it moves slowly downward throughout the root system of the plant by following the tiny conducting tubes in the stems and roots. The process is known as translocation. It is shown diagrammatically in Fig. 10, although, of course, the drawing is purposely exaggerated.

On some plants this process may take several weeks, but the end result is a 100 percent kill. It should be remembered, however, that not all herbicides perform in this manner. Some effect a kill only by contact, others by a translocation process. Only certain kinds are selective in action. Some solutions still are being distributed only for experimental purposes. There are others that kill by diffusion of vapors, Fig. 9. On small areas the chemical is forced into the soil by means of an applicator especially made for the purpose. The same type of applicator also is used to inject a soil fumigant which is poisonous to tiny worms such as nematodes, millipedes and others which live in the lower part of the surface soil. One diffusion-type weed killer, carbon disulphide, acts as an effective weed eradicator and also is toxic in its effect on such small but destructive animal life in the soil. Carbon disulphide is only a temporary and partial soil sterilant. Later, as it decomposes, this chemical tends to correct any excess alkalinity in the soil, and therefore favors the growth of desirable plants. Although very effective as garden herbicides, carbon disulphide and carbon-disulphide emulsions find more widespread use on farms where large quantities of a weed killer are required. This chemical must be handled carefully, since the vapor is highly inflammable.

Herbicides applied as spray solutions usually are of more value to the home gardener because of the ease of application and the inexpensive equipment required. Any light hand or power sprayer will do. Even a sprinkling can will



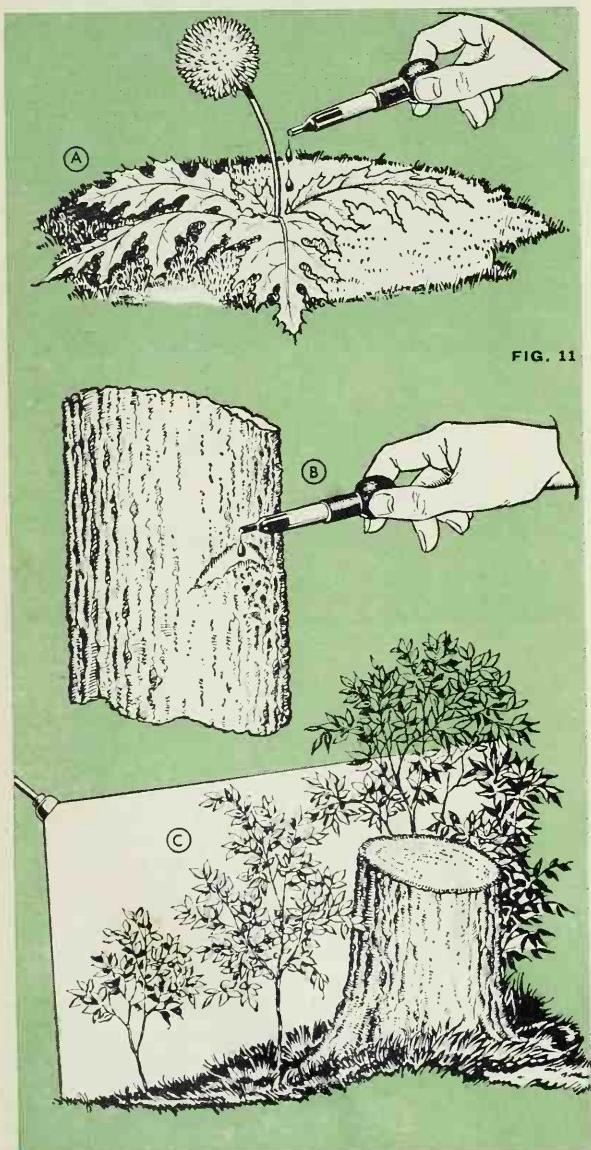
serve for very small areas, although sprinkling is not as effective as spraying. Most of these preparations contain varying amounts of the chemical, 2,4-dichlorophenoxyacetic acid, more popularly known as 2,4-D. These herbicides now are supplied in tablet, powder and liquid form. Another chemical, ammonium sulfamate, is coming into widespread use along with preparations containing 2,4-D to kill poison ivy and other woody plants and in the control of many common weed pests on lawns and golf fairways. Due to the extensive research now being carried on by manufacturers, the U. S. Department of Agriculture and state experiment stations, it is very likely that

new weed-killing chemicals will be discovered, also new and more widespread uses for those already well known.

Figs. 11A, 12 and 13 suggest methods and precautions to be used in ridding your lawn of weeds with weed killers of the selective plant-growth-regulant type, such as those containing 2,4-D. A single tablet dissolved in a quart of water will make sufficient solution to cover about 100 sq. ft. when applied with a small sprayer of the hand-operated type shown in Fig. 12. Use soft water to mix the solution if it is available. If you must use hard water, warm it slightly. Best results can be obtained by spraying on warm sunny days above 70 deg. Fahrenheit. If it is colder than 50 deg. Fahrenheit, there is little movement within the plant and thus no response to the spray. The sprayer used should produce sufficient pressure to break the solution into a drenching spray. The solution should not be reduced to a mist. A nozzle that can be adjusted to produce a fan-shaped spray is best for most jobs. Always follow the manufacturer's directions for mixing the solution in any quantity. The recommended proportions vary somewhat for the various forms in which the chemicals are supplied.

Spot spraying: Where weeds are in small patches or clusters, Fig. 12, spot spraying of lawns is more effective and saves considerable material. Where the weeds are scattered, then the medicine-dropper method shown in Fig. 11A is best. Here the chemical is used full strength. Only a single drop is required for most plants, such as dandelion, plantain, dock, etc. Certain kinds of trees in undesirable locations can be killed by gashing the trunk in several places with a hatchet or an ax and applying a few drops of chemical as shown in Fig. 11B. Under some conditions weed-killing preparations containing the chemical 2,4-D will temporarily discolor the lawn grasses. But there will be no permanent damage if the spray is uniformly applied in the solution recommended. However, concentrations sufficient to kill some common weeds that infest lawns will injure bent grasses under certain conditions and also will kill white clover. With a solution of 1 to 100 there usually is no permanent injury to bent grass. If you wish to preserve a

FIG. 11



seeding of white clover, then the weeds can be killed by the method shown in Fig. 11A. This procedure is far easier than digging out the plants one by one. In all-over spraying of a lawn, it is essential to protect flowers and shrubbery against drift of the spray solutions, Fig. 13. This can be done with heavy paper or some similar covering. But it is better to work on a quiet, windless day, or at night when there is no wind. Keep the spray nozzle close to the ground and avoid concentrating the spray. Newly fertilized lawns should not be sprayed for a period of two to four weeks.

Weed-killing sprays are fully effective only when the leaves are green and the plant is in active growth. Remember the temperature should be at least 70 deg. Fahrenheit. Cover the leaves of the plant thoroughly, especially larger growth such as the giant ragweed, Fig. 1, also poison ivy, poison oak, poison sumac and others. In spraying large lawn or garden areas, keep in mind the precautions to be taken against drift of the spray. On cutover land the sprays are most effective in killing sprouts, Fig. 11C, which may grow up from the stumps. In pastures, sprays containing the chemical 2,4-D will not permanently damage the common forage grasses such as bluegrass, redtop and the various fescues, but will damage the clovers common in pasture lands. However, where weed infestation is heavy, spot spraying can often be done effectively without unduly injuring the forage crops.

If you want to get an early start in your spring planting, you will do well to get the major part of your weed-eradication project out of the way in the fall. This is a good time for weeds to meet their doom as it will give the liberated soil time during the winter to take advantage of all the benefits bestowed by nature. The winter snows and rains will enter the weed-free ground more easily and allow the soil to mellow. Also, by ridding your premises of weeds in the fall you will prevent these garden pests from getting a strong foothold in the spring when they have ideal growing conditions. By putting in a few hours of work in the fall, you will have that much less work to do eventually, and you won't feel quite so rushed when spring arrives.



FIG. 12

Spot spraying of lawn is effective where weeds are found in clusters. This treatment saves both time and material

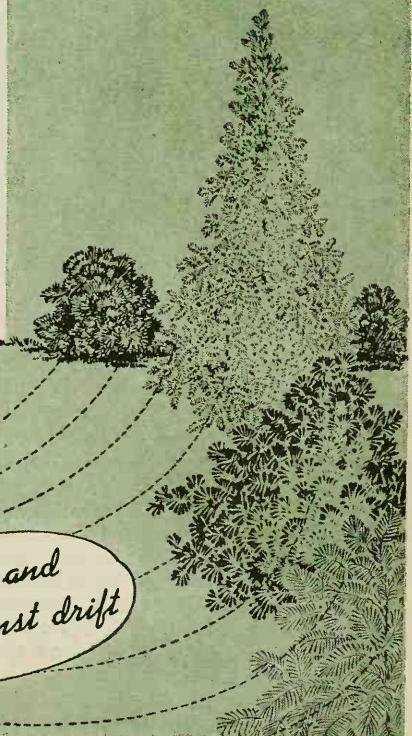


FIG. 13

*Protect all
evergreens and
shrubs against drift*

The nature of soil

NOW THAT you have cleared the weeds from your property through whatever means you chose to use, you are faced with the task of examining the soil you have to work with. Dig up a fistful of this soil and, holding it in your hand, let it run between your fingers. Get a good feel of it, for this is the substance that will determine your success or failure as a gardener.

Your property may be graced with good soil that will need little if any labor on your part to put it in shape for gardening purposes. Then again, you may have soil on your property that will make you work and work hard to get anything from it. Before we go into a discussion of what can be done to rebuild and cultivate your soil, let us look into the nature of this substance of earth.

Putting it simply, soil is the surface layer of the earth that supports plant life. Soil is the result of decomposition and disintegration of various kinds of rocks. Afterward, it has been placed in various locations by water, wind and glaciers. Soil particles are affected by climatic conditions, by decaying animals and plants and the microorganisms inhabiting these fossil remains.

Soil classifications: There are many ways in which soil can be classified. One way is to type it according to the parent rock from which most of it came. The breaking up of limestone rock, for instance, produces a clay soil that is predominantly alkaline (explained later). This type of soil is usually extremely fine grained. It tends to run together, producing poor drainage. If this type of soil is to be used for planting, it must be improved and lightened so that it will hold moisture and plant food more readily. The resulting soil is favorable for trees, bushes and vine fruits, and if proper-

ly managed will produce good flowers and vegetables.

At the other extreme from clay soil is the sandy soil which results from the breaking up of granites and sandstones. This type of soil allows water to pass through it too rapidly. The water carries plant nutrients right along with it. Soils made up of sandstone and granite rocks contain little or no alkali and usually are on the acid side (explained later).

The size of the particles that make up the soil is another way in which soils vary. For the purposes of the average gardener, soils may be classified in order of compactness as sand, sandy loam, silt loam, clay loam and clay. The two extremes, sand and clay, have little value as mediums for plant growth.

Soils also differ because of the varying proportions of decaying animal and vegetable matter (humus) that they contain. Even within a given soil, the proportions of animal and vegetable matter change from time to time. A peat or muck soil is nearly all humus; a clay contains practically none. In between the two is loam, which usually has about the right amount for average



FIG. 14

Something as common as a lump of dirt becomes a precious substance to a gardener, whose success or failure is largely determined by the type of soil present

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garden requirements. However, humus is restricted only to the upper layer of the cultivated soil where plant roots live and die. The soil below this zone is usually completely devoid of humus. This material continually breaks down into simpler substances, and this process is speeded up with cultivation and warm climate, so that humus must be frequently replaced in soils where it is needed.

Acid or alkaline: Do you have an acid or alkaline soil in your garden? If you have been stumped by this question, you can easily find the answer for yourself. Know-

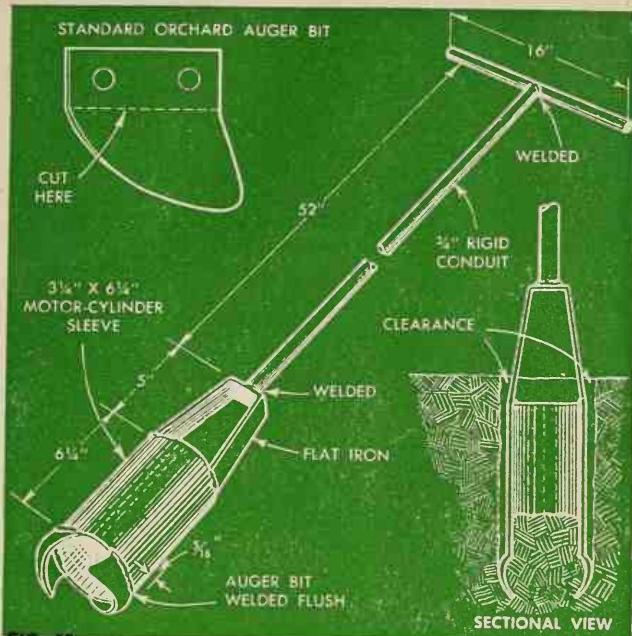


FIG. 15

Weighing only about 5 lbs., this hollow auger obtains unbroken soil samples and works well in dry, loose ground as well as in tight, sticky soil. A removable cylinder sleeve from a tractor engine is used for the body of the auger. The handle for turning and lifting is made from two pieces of electrical conduit welded as indicated above. The lower end of the handle is welded to an A-shaped bracket, the free ends of which are welded to the top ends of the cylinder sleeve. Two standard 4-in. soil-auger bits are welded to the other end of the sleeve, the bits being positioned so that they cut a bare diameter slightly greater than the diameter of the sleeve. The detail shows how clearance between soil and sleeve permits easy removal of the auger.

ing the exact nature of the soil you have to work with will help bring you better gardening results.

One way to classify soil is to designate it as acid, alkaline or neutral. The importance of this classification lies in the fact that certain plants grow best in acid soil while others fare better in alkaline soil. However, it should be pointed out that most plants grow successfully in neutral, slightly acid or mildly alkaline soils. Only the extreme soils cause serious trouble.

Soil testing: For the most complete and accurate analysis of the soil on your property, samples should be sent to your state university, which will analyze your soil and report back to you. As the soil on any plot of earth will vary from spot to spot, samples should be collected from a number of places and mixed thoroughly before testing.

One suggested method of collecting the soil is to make borings with a soil auger or a large carpenter's auger through a cultivated layer of soil. A hollow pipe, 1 or 2 in. in diameter, may also be used in collecting samples. The pipe should be driven into the soil and withdrawn, and the accumulation in the pipe knocked out. You can



even use a garden trowel to dig up needed soil samples.

In sending your soil sample to the university, you should accompany it with information describing your land, telling what use you want to put it to and how it has already been handled.

If you do not want to go to the trouble of getting information from the state university and are planning to garden on a small scale, there are certain tests that you yourself can perform on your soil. Interesting, though only partly satisfactory, is the litmus-paper test. You can purchase blue and red litmus paper at any drug store and conduct the test with a minimum of effort. All you need to do is to bring the soil in contact with the litmus paper.

If the blue paper turns red, your soil is acid; if the red paper becomes blue, you have alkaline soil. If either the blue or the red paper turns purple, the soil is neutral. Although the test is not too accurate, you can guess the degree of acidity or alkalinity of the soil by the speed with which the litmus paper changes colors.

More satisfactory than the litmus-paper test are the special soil-testing sets that have been devised and which may be pur-

chased at most seed stores. These chemical tests are inexpensive and yet they are delicate enough to give you accurate results. In conducting this test, you collect a sample of dry soil and saturate it with a green liquid.

The liquid is allowed to drain off after a minute, and the resulting color of the soil determines whether it is acid, alkaline or neutral. An alkaline soil will come out blue, while a red or yellow soil indicates acidity. The color charts that accompany these sets will give you the degree of acidity or alkalinity based on various shades of color. Scientists refer to this as the hydrogen ion concentration, which is more commonly referred to as the pH factor. The pH scale reads from 1 to 14 with 7 serving as the neutral point. Readings above 7 indicate alkalinity, below 7 show acidity.

Whether you use the litmus paper for testing or make use of a chemical set, you should analyze your soil at frequent intervals because the degree of acidity or alkalinity changes from time to time. Wet weather tends to make the soil more acid and dry weather increases alkalinity.

Acid soil: The acids contained in "acid" soil are carbonic, humic, tannic, acetic and others that are more complex. Acid soils are usually found above quartz, granite, gneiss, mica schist, sandstone, shale or slate rocks. However, soil above shales and sandstones is sometimes neutral or even mildly alkaline. Most plants thrive in neutral and even mildly alkaline soils, varying from 6 to 8 or even 5 to 9 pH readings. But there are certain plants that definitely prefer soil that indicates a reading of not over 6.5 and which grow best at 4 to 6 pH. A soil reading below pH 4 is too low even for the most extreme acid-loving plants.

Plants of the heath family, especially rhododendrons, are the most extreme in their demand for acid soil. These plants are

injured most frequently by alkalinity. For other acid-loving plants, see chart, Fig. 17.

One of the most common ways in which acid-loving plants are injured is by planting them too near the foundation of a building.

Pieces of stucco, plaster, lime, mortar and concrete are too often thrown carelessly at the base of a wall. These materials are all poisonous to plants that thrive in acid soils.

Even plants that prefer the mildly acid soil, such as evergreens of the pine family, are sometimes harmed and even killed by such materials.

Therefore, it is wise to remove soil that contains building rubbish from around the foundation of the building before acid-loving crops are planted. The planting should also be kept well forward from walls made of concrete, stucco, brick or stone with mortared joints, for the drip from walls of this sort will make the soil close by become alkaline.

To make an acid soil more acid, or to convert a neutral or alkaline soil to an acid one, there are a few materials that can be used. Of these, the most common are aluminum sulphate, sulphur and tannic acid.

Aluminum sulphate should be used cautiously, not more than 5 lbs. to 100 sq. ft. at a time. This material should be spread evenly and watered in. Sulphur also can be dangerous if too much is used. It should be scattered as evenly as possible in quantities of not more than 3 lbs. per 100 sq. ft. Tannic acid can be used more liberally, with 1 part to 50 of water being the recommended amount.

For the ordinary gardener it is safer to spade into the soil such materials as peat moss, pine or oak leaf mold, pomace or well-rotted hardwood sawdust. These materials can also be applied as mulch at the base of plants in the fall.

It has not yet been conclusively proved



FIG. 16
If a soil auger is not available to collect soil samples, an electric carpenter's auger will serve the purpose. Samples for soil testing should be collected only from the upper 6 to 8 in. of topsoil at various locations.

whether the acid-loving plants need the actual acid or the type of soil that results from the presence of acid. Therefore, materials such as the ones suggested are used rather than chemical aids. The type of soil required by these plants is loose, light, moist and rich in thoroughly decayed leaves, wood and other humus material.

The amount of acid-forming material that should be mixed with the soil depends on its original nature. An equal bulk of peat or leaf mold is needed for poor ground where the topsoil has been removed to give it proper consistency. A rich, light topsoil, on the other hand, requires only enough acid-forming material to make it distinctly acid. A bed of soil for acid-loving plants can be made by mixing one part each of peat, leaf mold and sand.

If you wish to grow acid-loving plants in a predominantly alkaline soil, an acid-soil bed properly mixed with peat and other materials should be placed in a raised position on top of the natural soil. It is unwise to dig in or place the acid soil in a hole, as the natural alkalinity of the near-by soil will encroach upon it. When earthworms come up from the subsoil into your acid-soil bed, they have a way of bringing lime along with them. To discourage the trespassing of earthworms, a 2-in. layer of soft-coal cinders should be placed between the new bed and the original soil. Acid material should be added to the improvised soil frequently to maintain the acidity. In case the local water is alkaline, collected rain water, which is always acid, can be used to sprinkle the acid-soil beds.

Alkaline soils: Limestone country is where an alkaline soil is usually found, and "hard" water is associated with it. The western "bad lands" are made up of extremely alkaline soil in which few plants will survive. Alkaline soil results from lack of rain to wash away the alkali salts. Another cause is continual irrigation with hard water which, in evaporating, leaves another accumulation of salts. Poor drain-

age also tends to make a soil acid. Ditching may be necessary to help neutralize the acidity. A slightly alkaline soil is satisfactory for gardening purposes except where acid-loving plants are to be grown.

Lime is often added to cultivate soil. The addition of lime changes the texture of the soil by releasing mineral foods, and at the same time it makes an acid soil neutral or slightly alkaline. An acid soil is often old and exhausted, and lime can be used to increase fertility. If you used acid materials such as peat, tree leaves or leaf mold in growing alkaline-loving plants, a sufficient amount of lime, limestone or bone-meal should be added immediately to counteract acidity.

In using lime to increase alkalinity, the treatment must be repeated at frequent intervals, since rain will wash the lime away and a naturally acid soil will return to its original form. Members of the pea family are common examples of alkaline-loving plants. If these and other alkaline-soil plants (see chart in Fig. 17), are forced to grow in acid soil, they will become stunted, sickly and yellow or reddish in color.

Neutral soil: Few soils are exactly neutral, a condition

which is neither acid nor alkaline. A pH reading between 6.8 and 7.2 is regarded as neutral. A neutral soil may be obtained by adding the proper amount of lime to acid soil and aluminum sulphate, sulphur or tannic acid to alkaline soil. Only for some scientific experiments is it necessary to have exactly neutral soil. In practice many gardens are close enough to this stage.

In review, to test the soil for acidity or alkalinity, remember the following points:

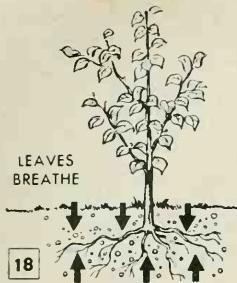
1. Collect several samples of soil, each from a different spot, and mix them together well before testing.
2. If you send samples to the state university, be sure to include information describing the land and how it is to be used.
3. Test your soil at frequent intervals, as the degree of acidity or alkalinity changes from time to time.

| SOME ACID-LOVING PLANTS | | |
|-------------------------|-----------------|------------------|
| Andromeda | Heather | Pieris |
| Azalea | Hemlock Spruce | Pine |
| Baptisia | Hickory | Platycodon |
| Bayberry | Huckleberry | Radish |
| Blackberry | Lady's-slipper | Raspberry |
| Blueberry | Leather-leaf | Rhododendron |
| Butterfly Weed | Ledum | Sourwood |
| Cardinal Flower | Leucothoe | Sweet Fern |
| Chrysanthemum | Lupine | Sweet Pepperbush |
| Cranberry | Lily | Spicebush |
| Dutchman's-breeches | Magnolia | Spruce |
| Fir | Marigold | Swamp Fern |
| Flax | Mountain Laurel | Trailing Arbutus |
| Galax | New Jersey Tea | Wintergreen |
| Ground Pine | Oak | Yew |
| Heath | Orchid | |

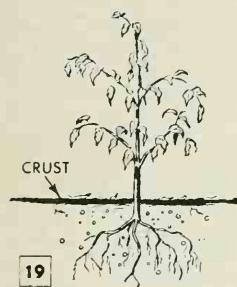
FIG. 17

| SOME ALKALINE-LOVING PLANTS | | |
|-----------------------------|------------|-----------|
| Alyssum | Celery | Parsnip |
| Asparagus | Cucumber | Pea |
| Bean | Geum | Phlox |
| Beet | Iris | Rhubarb |
| Cabbage | Lettuce | Salsify |
| Carnation | Mignonette | Squash |
| Canteloupe | Nasturtium | Sweet Pea |
| Cauliflower | Onion | |

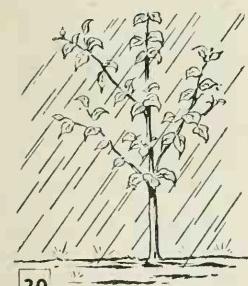
Rebuilding the soil



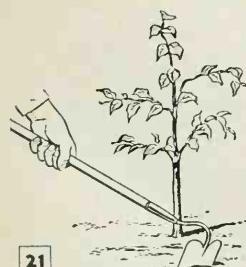
18 In porous soil, roots take air from the soil above water level and absorb water from moisture of deep soil



19 As water subsides, the surface becomes crusted and prevents free air circulation



20 In heavy rains, air is excluded. Plants suffer if this condition lasts too long



Shallow cultivation encourages free circulation of air and plant is quick to return to vigorous growth

SOILS DIFFER WIDELY in their capacity to produce plants. In most cases the gardener has to make the best of what soil he happens to have. Practically any soil, no matter how poor it is, can be improved. However, the cost, time and labor involved in such a project are sometimes so great that it would be more practical to replace worthless soil with topsoil which is brought in from another source.

Although the type of soil required for successful gardening differs from plant to plant, there are certain things that are necessary for all soils. In rebuilding and cultivating soil, attention must be given to drainage, aeration, soil structure and plant food.

Proper drainage: The soil acts as a reservoir from which plants drink water whenever they need to. Therefore, a proper supply of moisture must be available at all times. Too much water is as harmful to the plant as too little. If surface soil is watered too often, it is kept moist and root growth is encouraged near the surface. With the roots too near the surface, neglect in watering or a period of unusually dry weather will ruin the feeding ground of the roots and kill them. If the surface soil is kept dry, however, the roots will be forced to go deeper into the ground. Then unusual climatic conditions or a slight deviation from the regular watering schedule will be less likely to harm the plants.

The amount and frequency of watering will depend upon the dryness of the atmosphere as well as that of the soil. A gravelly, sandy soil, especially if it is not well provided with organic matter, is unable to hold water for any length of time. The water passes through to the lower levels so quickly that the surface-rooting plants cannot benefit. At the other extreme is heavy clay soil, in which water remains in the upper levels and is available to the roots for a longer period of time. Here, however, too much water can collect and plant roots will rot.

A too sandy condition can be corrected by adding such materials as well-rotted stable manures, compost, leaf mold and peat moss. On stiff clays deep digging and the introduction of gritty material like sifted coal ashes will help to make it more porous. The use of lime dressings will also assist in breaking clay into a more granular soil structure which will drain better.

You must try to build a soil that will absorb a large amount of water and give it up when the plants need it. Provision also should be made for drainage, so that when the soil has absorbed as much water as it is able to hold, the surplus will run off the land. If the surplus water will not pass away freely, artificial drainage must be provided.

Tile drainage, as illustrated in Fig. 23, is the most effective way by which excess water can be disposed of. Tile should be trenched in as shown in the illustration. Drainage by a system of tiles is, however, expensive, and if the soil is heavy it may not solve the problem of bad drainage.

Another alternative is to dig a trench about 3 ft. deep and



If tile is not available, drainage trenches can be dug and filled with rubble, as illustrated, which will also permit excess water to run off



Tile drainage is an effective way to carry away excess water. If tile is available, it can be trenched in for garden drainage as illustrated

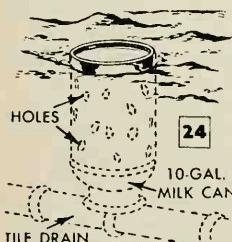
place a layer of stone or rubble in the ditch, as shown in Fig. 22. The rubble or stone should be about 9 in. deep and covered by inverted sods, which in turn should be covered with 2 ft. of soil. In addition to this system of drainage, a suitable outlet should be provided to carry off any water that might otherwise accumulate in it. This can be accomplished by installing a drainpipe which will take the excess water to a sewer or some other suitable outlet. It is especially important that a drainage outlet be provided for at the base of a terrace or foot of a slope which is walled in by masonry. Fig. 25 shows a way in which this problem can be taken care of.

Aeration: Air is as vital to plant roots as it is to any living land organism. This means that provisions must be made for the passage of air in the soil where the roots live and breathe. As long as the soil is porous enough, the air will circulate of its own accord. Scientific studies have shown that air is completely changed once every hour down to a depth of 8 in. in porous soil.

A poorly aerated soil produces unsatisfactory growth of plants. Well-granulated and thoroughly cultivated soils reduce the toxic gases, such as carbon dioxide, and increase the oxygen content to a point needed for the best growth of roots.

Good drainage and proper aeration go hand in hand. If the land becomes flooded and there is no outlet for the excess water, the plants will drown as would any animal which is trapped in a body of water. When the water can be drained off, air will re-enter the soil as the water sinks away. However, if the surface has become compact from wetting, baking in the sun or other causes, the air is blocked off and the plants will suffer.

The main purpose of cultivation, which will be discussed more fully in a later section, is to loosen a crusted surface and allow the air to circulate in the soil. Another way in which to prevent crust formation and keep fresh air in the soil is by the use of mulches, or layers of leaves, straw, etc.



Here is another drainage aid, especially effective after heavy rains. Invert an old milk can and place it over the joints of a tile drain. The cans are perforated. One can to every 30 to 40 rods of pipe will take care of the excess water.

Short lengths of $\frac{1}{2}$ -in. pipe, spaced 2 ft. apart in the first mortar joints of a masonry retaining wall, will assure good drainage at the foot of a slope.

The key to free passage of air in the soil is porosity. As has been pointed out before, soil can be made more porous by adding such materials as torpedo sand, cinders, ashes, limestone screenings or any kind of humus.

Structure of the soil: A soil that is in good structural condition absorbs heat and quickly transfers this warmth to growing plants. Such a soil also allows easy root penetration. It has been pointed out that the drainage and aeration of the soil can be corrected by the introduction of certain materials. Ideal conditions for transfer of heat and root penetration may also be obtained by the addition of new materials.

Soils differ in their ability to provide a suitable temperature for the germination of seeds and the growth of plants. Sandy soils conduct heat readily, but peat soils are poor heat conductors. Therefore a peat soil would have to be "warmed up" by the addition of cinders, ashes and other materials that would make the soil more sandy in its makeup.

The presence of humus in the soil is of prime importance to its structure. As a matter of fact, humus is what gives life to the soil; without it soil would be like pure sand or clay, both of which are unsuited for plant growth. This organic material is made up of the decomposed remains of vegetable and animal matter.

Although some humus accumulates in the soil through natural processes, this organic matter must be added from time to time in order to support plant life. Humus is being lost constantly, largely through "burning." This means that gaseous products of oxidation are continually given off from decomposing humus and lost in the air unless they can be reabsorbed by the soil. The activities of microscopic forms of life in the soil break down complicated organic materials into simpler humus compounds. But these are constantly being taken up by plants, washed away or released into the air until nothing is left in the soil except mineral matter.

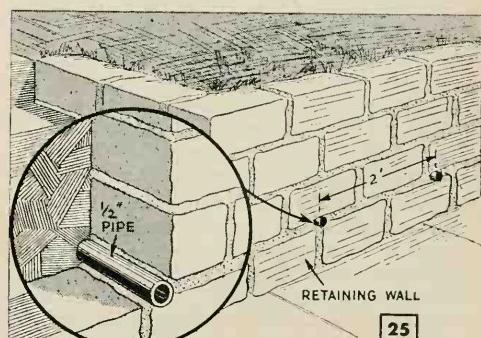




FIG. 26
Mulches placed over the soil prevent crust formation



FIG. 27
Mix bone meal into the soil as evenly as possible

Loss of humus is most rapid in sandy soils because of the loose structure and the better drainage, and, therefore, higher temperature. It would thus follow that the addition of humus to a sandy soil would give it more body. Clay soils, on the other hand, will be improved by humus by loosening them up and making them more porous.

Besides improving soil structure, humus also serves the following purposes: it contains nutrients without which plants could not survive; it is a good reservoir for surplus water and thus prevents the soil from drying out; bacterial and other minute organisms are provided with congenial conditions in which to prepare the plant food for consumption; it also provides the raw material for the plant's food-manufacturing operations.

Since the gardener must keep the soil continually supplied with humus, he must have a good supply on hand at all times. One way to manufacture humus is to build a compost pile, which is discussed later on in the chapter. Humus can also be provided by growing the grass and fiber plants called green manures. Alfalfa, rye and soybeans are examples of green manures. These should be dug or plowed under while still green and soft in order to supply the soil with necessary vegetable matter. These materials become humus when decayed. The turning under of green vegetable matter will, of course, have to be done well in advance of the planting season. For the organic matter should be completely decayed before any planting is begun.

Plant nutrients: Nitrogen, phosphorus and potash are the three elements upon which practically all plant food is based. Besides containing these elements, fertilizers usually also contain enough other materials, such as sulphur, magnesium and

manganese, to provide a balanced food for the plant. Fertilizers can be placed in three general classifications: manure, bone meal and commercial fertilizer.

Manure is considered the best fertilizer for flower gardens. The chief objections to it are that it is slightly unbalanced in phosphorus content and often carries weed seeds. These defects can be corrected. The addition of superphosphate to this fertilizer will balance it and make a perfect plant food. About 1 lb. of superphosphate to 15 to 20 lbs. of manure are the correct proportions. As for the weed seeds, they can be killed by composting the manure for about three months. Manure is also a safe fertilizer to use as it does not hurt the plants and at the same time holds excess moisture.

Rotted cow and horse manure, hen manure and prepared sheep or cow manure are of value in the order named. There should be as much rotted cow or horse manure worked into the soil as can be done reasonably. Hen manure, being several times richer than cow or horse manure, should be used more sparingly. About 1 lb. for every 3 sq. ft. of prepared cow and sheep manure can be used. In general, 50 lbs. or more of manure can be used per 100 sq. ft., and it should preferably be spaded in the garden in the spring when the garden is made.

Bone meal contains some nitrogen, some phosphorus and a little potash. Its chief value is that it will not burn the plant. Although bone meal will feed the plants for a long period of time, it will not react as quickly as the more readily available fertilizers. Five to 8 lbs. of bone meal per 100 sq. ft. is the amount to be used. It should be scattered over the land and worked into the soil. Since bone meal alone works slowly, for quicker results mix 5 lbs. of bone

FIG. 28

FERTILIZER APPLICATIONS

| KIND | 100 SQUARE FEET OF BED SURFACE | 100 LINEAL FEET OF ROW | 1 BUSHEL OF SOIL | AS A TOP-DRESSING FOR GROWING PLANTS |
|-------------------------------|--------------------------------|------------------------|------------------|--------------------------------------|
| Rotted Manure | 2-in. layer | 2-in. layer | 1/4 bu. | 1-in. layer |
| Leaf Mold | 2-in. layer | 2-in. layer | 1/4 bu. | 1-in. layer |
| Bone Meal | 5 to 8 lbs. | 4 to 6 lbs. | 3/4 lb. | 2 lbs. per 100 sq. ft. |
| Superphosphate | 5 to 8 lbs. | 4 to 6 lbs. | 3/4 lb. | 2 lbs. per 100 sq. ft. |
| Muriate of Sulphate of Potash | 1 to 2 lbs. | 1 to 2 lbs. | 2 oz. | 1/2 lb. per 100 sq. ft. |
| Ammonium Sulphate | 1 lb. | 1 lb. | 1 oz. | 3/4 to 1 lb. per 100 sq. ft. |
| Nitrate of Soda | 1 lb. | 1 lb. | 1 oz. | 3/4 to 1 lb. per 100 sq. ft. |
| Ammonium Nitrate | 1/2 lb. | 1/2 lb. | 1/2 oz. | 1/2 lb. per 100 sq. ft. |

meal with 1 lb. of nitrate of soda and use this at the rate of 4 lbs. per 100 sq. ft.

While in a seed store, have you ever noticed certain mystifying number combinations such as 5-10-5, 2-6-4 and 5-8-7 on fertilizer bags? These numerals report the percentages of nitrogen, phosphorus and potash which are contained in commercially prepared fertilizers. These fertilizers are useful to every gardener, but they are only temporary rather than qualifying as long-term soil improvers.

The 5-8-7 fertilizer, containing 5 percent nitrogen, 8 percent phosphoric acid and 7 percent potash, is typical of the commercial variety. If used too heavily and at too great a concentration, it will burn the roots of the plant. Because the soil solution becomes stronger than the plant solution when 5-8-7 is added, the water will be caused to leave the roots, which soon become shriveled. Therefore, care must be taken to mix the fertilizer well with the soil and not to use too much of it.

After the flower bed is spaded, the 5-8-7 fertilizer should be broadcast over the soil, at the rate of 3 to 5 lbs. per 100 sq. ft., and raked well into the soil. Wait two or three days or at least until after a rain before planting any seeds.

The safest nitrogen-carrying fertilizers are milogranite, cottonseed meal and pulverized sheep manure. Milogranite and cottonseed meal can be used at the rate of 1 to 2 pounds per 100 sq. ft., and sheep manure at 6 to 8 lbs. per 100 sq. ft. As in the use of all fertilizers, these should be worked well into the soil.

Nitrate of soda and sulphate of ammonia are satisfactory substitutes. Although they are more readily usable by the plants, they are likely to cause injury if used in too large quantities. The amount that can be used is so small that, for satisfactory distribution,

these materials should be applied dissolved in water or mixed with dust, coal ashes or some other material to give bulk. One fourth to 1/2 lb. per 100 sq. ft. of soil is a light application. If applied in preparing new beds, the material may be put on after the spading is done and worked into the soil during raking.

Nitrogen is the most important plant food as far as fruit trees are concerned. An application of a pound or two of nitrate of soda per 100 sq. ft. early in the spring before the buds open will supply all the plant food necessary to fruit trees. Nitrate of soda may also be used on individual shrubs at the rate of a quarter pound per shrub or approximately a handful scattered within a 5 or 6-ft. radius. The chart in Fig. 28 shows the fertilizer applications recommended by the University of Missouri Agricultural Experiment Station.

Compost: What about a compost pile? Is it worth the time and trouble to make one? The answer to that question is yes with a qualifying "if"—that one goes about making the compost pile in the correct manner. By following the rules carefully, your heap of decaying matter will produce a rich, loose and easily pulverized soil preparation which will add both humus and plant-food elements to your soil in a safe and convenient way.

Making a compost pile is a relatively simple matter. The basic material is green plant stuff—leaves, weeds, pea pods, beet tops, hay, etc. Care should be taken, however, to stay away from diseased celery crops, anthracnose-infested beans, blighted phlox tops and diseased peony stems. The use of such materials will spread disease in the soil. Straw, leaves, hay or cornstalks are perfectly safe materials to use. The general rule to follow is to use soft, green material rather than hard, woody plants or

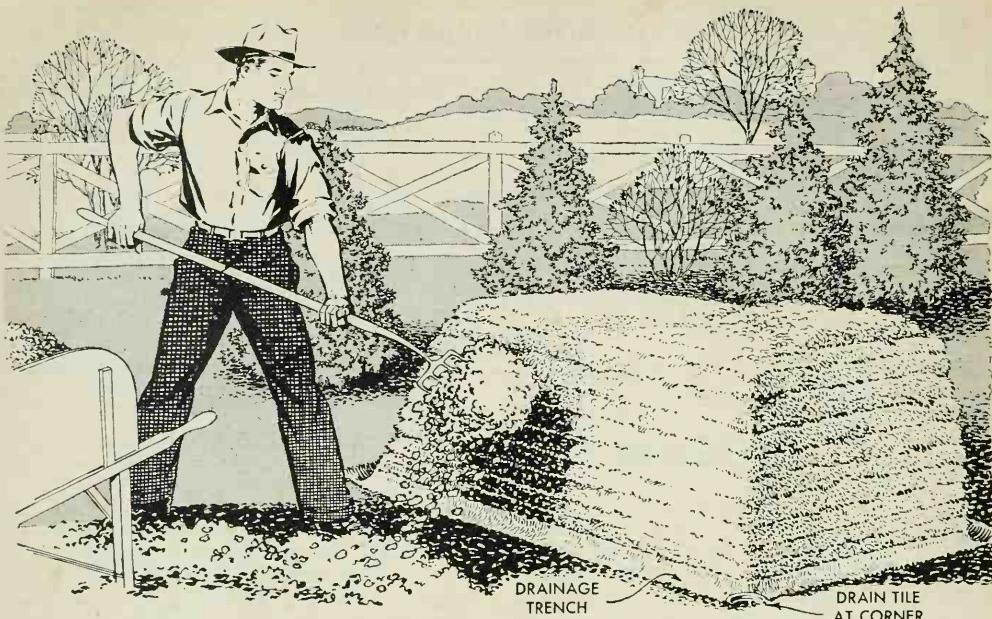


FIG. 29

A compost heap is a must in all good gardening procedure. It not only offers a means of disposing of all refuse which is not diseased, but eventually makes an excellent fertilizer containing essential plant-food elements

anything thick which would take a long time to decompose.

Fertilizer mixtures may or may not be used in your compost-heap construction. One such mixture consists of 3 lbs. ammonium sulphate, 1 lb. superphosphate and 3 lbs. ground limestone for every 100 lbs. of dry weight used. Another mixture includes 3 lbs. ammonium sulphate, 1½ lbs. superphosphate, 1¼ lbs. potassium chloride and 2½ lbs. ground limestone.

If either of the above mixtures is used, it should be combined with the hay or leaves and mixed thoroughly. Alternate layers of organic matter with a sprinkling of fertilizer should be built up, finishing with a concave top to catch rainwater. Water should be added to the compost pile from time to time, and at the end of three to four months you will have a heap of completely decomposed matter. A compost such as this will be free from weeds and odors and will have a composition similar to the average barnyard manure.

Good compost can also be manufactured without the help of the above-mentioned fertilizer mixtures, but it will take longer. Starting with a pile of plant material, build this first layer to a height of about 1 ft. Then spread a thin layer of soil, the quality of which is unimportant, over the plant material. If fresh or well-rotted manure is available, that should be sprinkled on the soil. Another plant layer follows, and the procedure is repeated several times. Re-

member to provide a concave top.

This pile of compost must be turned over once every three or four months except during the winter, at which time the pile should be liberally dosed with lime. The pile should also be kept moist by occasional waterings. It will take approximately a year for this material to turn into usable compost.

Many gardeners object to having a compost pile on their property because of its unsightly appearance. However, such a pile need not be too unpleasing to look at. By using the alternating layers of plant material and fertilizer and making a sandwich-like heap, the compost pile can be given a neat appearance. The pile may be made even more inconspicuous by placing it in a secluded corner. If there are shrubs on your lot, you can use them to hide the compost pile. The illustration in Fig. 31 suggests fencing off a piece of your backyard to keep the compost heap out of sight. This enclosure can also serve a double purpose as a storage place for a wheelbarrow, tools, ash cans, etc.

Another novel way to make your compost pile inconspicuous is to build a circular form of woven-wire fencing, like the one shown in Fig. 30. This will keep your compost neatly heaped in one place.

Artificial manure and fresh manure: A few words of caution should be added at this point about substituting the recommended fertilizers with artificial manure

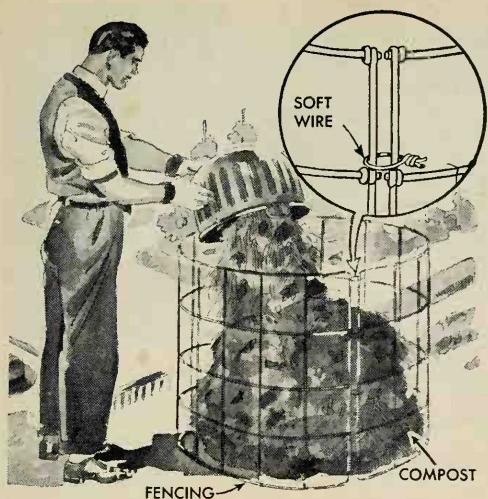


FIG. 30

You can prevent your compost pile from spreading all over the ground by enclosing it with a circular form made of woven-wire fencing. The ends of the fencing are wired together so that the form can be removed when it is full. Then the form is set in a different location for filling again.

and fresh manure in their natural states. Fresh manure should not be used as a fertilizer unless it is spaded into the soil deep enough so it will not touch the plant roots. Even then its use is not advised unless other materials cannot be obtained.

Artificial manure, such as leaves, old hay and other organic matter, should also be used as little as possible for fertilizers. All breakdown of organic material is caused by fungi or bacteria, which must have nitrogen, phosphorus and potash to live and thrive the same as higher plants. Thus, when you turn under dry leaves, dry hay, straw or cornstalks, these materials in themselves rob the garden of nitrogen, phosphorus and potash which should have gone to the growing plants. The soil would thus be made poorer for the time being than it would have been if the organic matter had not been added.

Disease control in soil: In addition to providing a soil with ideal conditions in drainage, aeration, structure and nutrition for the plants, care should also be taken to prevent and control the spread of disease. Harmful fungi and molds in the soil are often responsible for poor germination of flower and vegetable seeds.

Disease control should obviously begin by first having a healthy soil. The simplest way to destroy soil-borne organisms and to prevent poor germination is to treat the soil beforehand with formaldehyde. A solution of 40 percent formaldehyde, which may be purchased at any drug store, is further

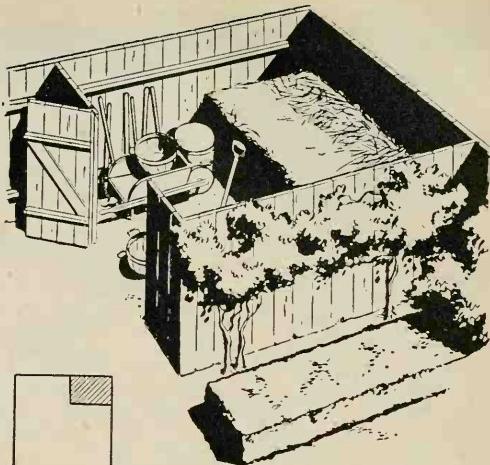


FIG. 31

If there are no large bushes or buildings on your property behind which to hide a compost pile, fence off a piece of your backyard as shown in the drawing above. Fencing in an area of about 10 x 10 ft. should accommodate a wheelbarrow, tools, ash cans, etc., in addition to the compost pile as pictured above.

diluted with three or four parts of water. This mixture is then sprinkled over the soil and thoroughly mixed in.

Soil thus treated is allowed to stand for 24 hours to let the formaldehyde fumes destroy harmful organisms. After 24 hours, the seeds can be planted, after which the soil should be watered thoroughly.

Bringing in topsoil: If you do not have good topsoil and the soil on your property cannot be rebuilt and cultivated at reasonable expense and labor, you will want to know what is involved in importing topsoil for your garden and lawn. The lack of natural topsoil suitable for plant growth is a predicament in which many ambitious gardeners-to-be find themselves. Contractors often obtain rights to take the topsoil off large areas of vacant land in certain communities for the sole purpose of selling this topsoil to gardeners. The land robbed of its topsoil is worthless for gardening. In other instances good topsoil, which it has taken nature hundreds of years to develop, is ruined in a matter of a few hours by careless home builders who cover the good topsoil with basement dirt and building debris. If you are a victim of such circumstances, then you will have to import topsoil for your garden. To be sure of rich and weed-free soil, buy it from a reputable nursery. Beware of itinerant trucks labeled, "Rich Black Soil."

Although the average person has little choice as to native soil for his garden, he should take steps to protect whatever good

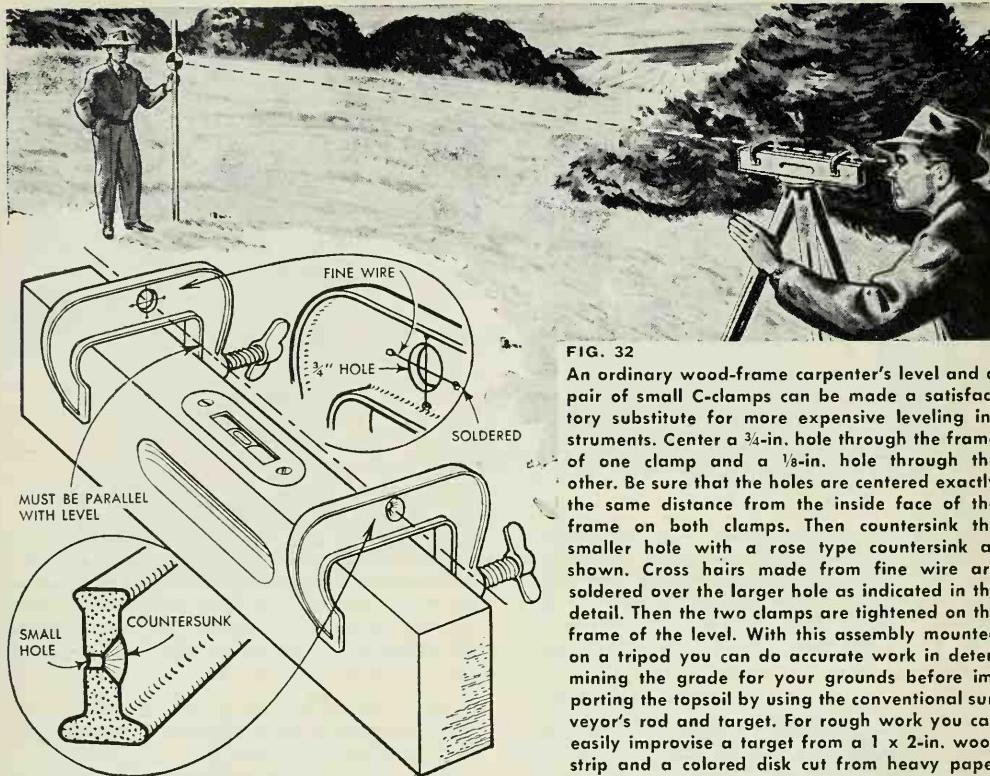


FIG. 32

An ordinary wood-frame carpenter's level and a pair of small C-clamps can be made a satisfactory substitute for more expensive leveling instruments. Center a $\frac{3}{4}$ -in. hole through the frame of one clamp and a $\frac{1}{8}$ -in. hole through the other. Be sure that the holes are centered exactly the same distance from the inside face of the frame on both clamps. Then countersink the smaller hole with a rose type countersink as shown. Cross hairs made from fine wire are soldered over the larger hole as indicated in the detail. Then the two clamps are tightened on the frame of the level. With this assembly mounted on a tripod you can do accurate work in determining the grade for your grounds before importing the topsoil by using the conventional surveyor's rod and target. For rough work you can easily improvise a target from a 1×2 -in. wood strip and a colored disk cut from heavy paper

topsoil is on his property. If you are having a house or any other building constructed on your property, it is wise to make arrangements to have the topsoil moved aside while construction is going on.

You will remember that topsoil is that upper layer, usually about 6 in. to 10 in. deep, of normally fertile, arable, loamy soil which is found in well-cared-for gardens or in uncultivated, undisturbed fields, pastures and valleys. The keys to its ability to grow plants are its humus content, aeration and the presence of bacterial and other microscopic organisms that give life to soil.

In selecting the topsoil which you plan to import, it must be remembered that it is not the richness or fertility of the soil which is of basic importance. On the contrary, it is the physical condition which determines the soil's value. Plant food can always be added to enrich a given soil, but the texture of the soil particles, their structure or arrangement and the content of organic matter must be of the correct nature for successful gardening.

A good formula for general-purpose garden loam consists of 20 percent sand, 40 percent clay and 40 percent humus. Although many plants prefer other mixtures and a successful garden can be grown with less than this requirement, this formula provides a good aim in striving for the best.

In more general terms, a good topsoil is one between the extremes of clay and sand. This is called a loam soil. A reasonable amount of clay in the soil will give it mass and body while a sufficient quantity of sand will provide drainage of surplus water. Given the correct balance of clay and sand, you now need organic matter to bind the particles together and provide a reservoir of moisture.

Before you spread your imported topsoil, you will have to consider the final grade level desired. If the addition of a layer of topsoil will make the final grade too high, you will have to remove some of the subsoil. In doing this, consideration should be given to the possibility that the soil at the surface will be a great deal better than the subsoil exposed after the surface soil is removed. If this should be the case, the moderately good soil can be moved aside, several inches of subsoil disposed of, the other soil put back and the new topsoil brought in. Figs. 32, 33 and 34 suggest ways in which your grounds can be graded with the least trouble.

Before the topsoil is introduced, an inch or two should be spread over the existing soil and then spaded or raked in so that there will be gradual change from subsoil to topsoil. Then the balance of topsoil may be spread to a depth of 4 to 6 in. If there

is time, it is wise to complete the soil-modification program a full growing season ahead of the planting. If this is done, the soil will be given time to settle, and it is better if this occurs before seeding.

In making calculations as to the amount of topsoil needed, it is necessary for you to know that 16 cu. yds. of topsoil will make a loose fill to a depth of 4 or 5 in. over 1000 sq. ft. This will then settle to a depth of 3 to 4 in.

Although rebuilding and cultivating soil go hand in hand and are carried on simultaneously, discussion of the two operations is kept separate to avoid confusion. However, while a certain amount of rebuilding will have to be done each season, this task grows smaller once your soil has been provided with proper drainage, good aeration, etc. Soil cultivation, on the other hand, consists of the same muscle-demanding tasks each year.

Soil disinfection: Complete sterilization of the soil is not desirable for planting purposes. Instead, only the disease-causing agents should be controlled, which means partial sterilization, or disinfection, of the soil.

Heat, electricity or chemicals can be used to disinfect the soil. Baking the soil in an oven is relatively simple where only a small amount of soil is needed. Place the soil in a metal container with a medium-sized potato in the center of it. Put the container in the oven and leave it there until the potato is baked. Where a large amount of soil is involved, cover the soil with straw or brush and keep up a fire for an hour or so. There are also electric cookers on the market, especially for disinfecting soil.

Partially sterilizing the soil with steam is probably the best way. This method is especially applicable to greenhouses. Steam can be applied to outdoor seedbeds by passing it through loose tiles or perforated pipe buried in the soil. Small amounts of soil can be disinfected in a large pressure cooker as used for canning.

Formaldehyde is the most common of the chemicals used for soil disinfection. See page 33 for directions on how to use it.

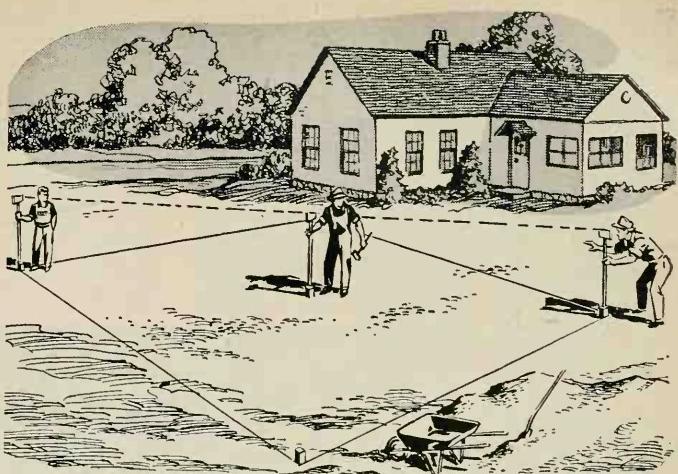


FIG. 33

To obtain an evenly graded lot before bringing in topsoil, use three wooden tees to level the tops of stakes driven into the ground. The tees are made by nailing 8-in. crosspieces to boards 4 ft. long. Drive a stake at each corner of the area to be filled and leave the stakes extending above ground a distance equal to the desired depth of fill. Get two persons to help you and set a tee upright on one corner stake and another tee on the stake at the opposite corner. Then drive a stake at the center of the area and stand a tee on it. Sight over one of the corner tees and across the top of the center tee to the tee at the opposite corner, and then drive in the center stake until the top of the center tee is exactly level with the tops of the other tees. The tops of the stakes, in turn, are also level. Proceeding in the same way, drive stakes about 6 ft. apart throughout the area. The final step consists in filling in with dirt to the tops of the stakes.



FIG. 34

Inconvenience of having a low chalkline in the way, or of having it covered by dirt when making a grade, can be avoided by raising the line above the predetermined level of the grade a distance equal to the height of a shovel blade. The grade level now can be determined by lowering or building it up until the shovel will just pass between the grade and line.

Cultivating the ground

SOIL CULTIVATION revolves around plowing on the farm and spading in the garden. These ancient practices, which date from prehistoric times, have recently been attacked by critics of traditional methods of agriculture. Despite the controversy that is going on, many experiments apparently have shown that spading in gardens and plowing in fields are good methods of conditioning the soil for planting. Moreover, most tillers of the soil continue to use these methods to ready for planting.

When should you start preparing the soil for spring planting? Ideally, autumn is the best time of the year for this task. At that time the soil is usually in better condition to be worked, and a good start in spring planting is assured. When the soil is prepared in the fall, it will get the full benefit of the winter elements. Frosts, rains and melting snows can better exert their beneficial influence and kill the harmful organisms.

When to spade: Before any spading can be done, the soil must be in just the right condition. An important axiom that the gardener must observe is: "Never work the soil when it is wet."

Spading wet soil can cause great harm. Rather than loosening the soil, letting in the air and preparing a good seedbed through which roots will penetrate easily, spading wet soil will create clods which cannot be broken up all season. It is equally bad to attempt spading when the soil is too dry or cloddy, especially if the soil tends to be heavy.

There is a point at which the soil is neither too dry nor too wet and any gardening task can be accomplished with the minimum of exertion and the maximum of results. Whether you are cultivating the soil,

sowing seeds or transplanting seedlings, these tasks can be performed most easily and efficiently when the soil is just right.

The "just right" condition of soil can be determined easily. Merely pick up a lump of soil and squeeze it between thumb and fingers. If it becomes a mud pie, the soil is too wet; if the specimen crumbles into dust, it is too dry. However, when the soil can be lifted easily in one piece, yet crumbles like piecrust when a little pressure is exerted against it, you can get out your spade and start working. The illustration in Fig. 1 points out the difference between the soil that is too wet and that which is just right.

Spading technique: Spading up a garden is not merely a matter of loosening the soil. The basic trick is to turn each bladeful of soil completely so that what was the top becomes the bottom. This is essential to get the nutrients already in the soil properly distributed. If you are using a layer of manure or compost, spading is needed to get this down where plant roots can reach it.

Drive the spade straight down, as in Fig. 2, to get maximum depth. Then lift the contents of the spade high enough so that you can drop the "spit" of soil bottom side up.

Do not take too large bites if using a fork. This makes the work harder to do and you may bend or break a fork tine. Give each forkful a whack with the back of a hoe to do a little more breaking up if necessary. Finally work the smaller clods down to a proper granulation with a rake, as in Fig. 4, at the same time you are smoothing and leveling the surface.

When spading in the spring, be careful not to push undecayed leaves, manure and



FIG. 1

Before you start to spade, test the soil with your hands. The lumpy soil in the girl's right hand is too wet for spading. But if the soil crumbles easily, as in the girl's left hand, it is time to spade

National Garden Bureau

plant stems into the soil, nor turn over heavy sod. Light sod and thin plants may be turned under. Generally, however, it is better to pile up sod and debris in a compost pile to decay rather than spading it into the soil in the spring, where it is likely to interfere with cultivation. Moreover, it will not increase the food content of the soil until it is well decayed, and may even reduce the food nutrients available to the plants. A light dressing of manure may be used if spread evenly in the spaded earth. The manure should be buried so deeply that it will not interfere with your cultivating tools.

Depth of spading: Another debatable garden subject is depth of spading. English gardeners are known to favor "trenching," which is the term applied to turning over the soil two spade lengths deep. The standard garden spade has a blade 12 in. long, so trenching loosens the soil to a depth of 2 ft.

Trenching is used quite extensively in preparing the ground for roses, perennials and some annuals. It is a good way to prepare a perennial bed, as the plants are to grow for several years without disturbance. However, when it comes to vegetables and most annual flowers, turning the soil to a depth of 12 in. has proved to be sufficient.

Double digging: An approved way to improve soil is by the method of "double digging," which should be done in the fall of the year. First, the subsoil is uncovered by digging a trench 2 ft. or more in width. The subsoil is then broken up to a depth of a foot and fertilizer is mixed with it. This done, a second trench is measured off. The topsoil from this trench is now turned over onto the subsoil of the first trench, thus exposing the subsoil of the second trench, which is now treated in similar fashion. This process of shifting the topsoil over and uncovering the subsoil is repeated until the final trench is reached. Here the soil that was taken from the first trench is used to fill the last one.

As the topsoil is turned over it should be mixed with fertilizer. When the area is finished, a dressing of superphosphate is applied at the rate of 20 to 30 lbs. per 100 sq. ft. If each year a part of the garden is worked under the system of double digging, in a few years a soil of good tillable depth may be obtained over your entire garden.

"Ridging" is another method of fall preparation, and one which is less laborious. This process consists in digging the surface soil as deep as possible and throwing it up in rough ridges, mixing in fertilizer as the ridge progresses. More surface is thus exposed to the action of the weather.

During the winter, moisture from rains and snows collects in the furrows of the

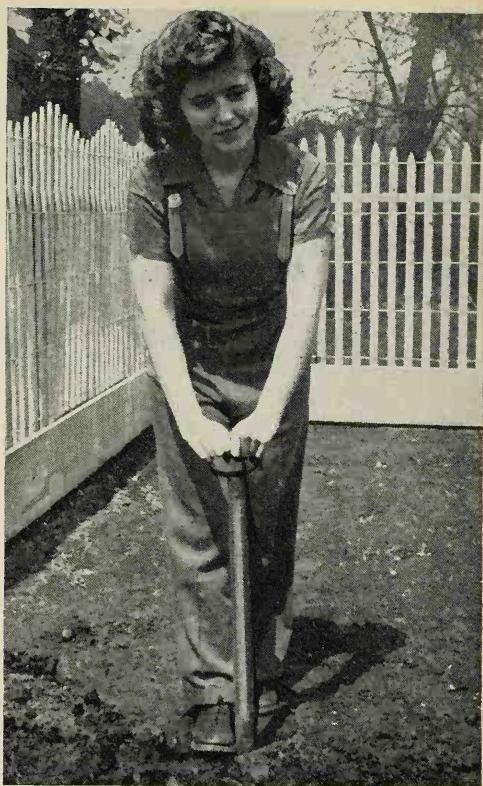


FIG. 2

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The correct technique for spading is shown above. Grasp the handle of the shovel firmly and drive the shovel straight down until the blade is out of sight

Careful planning of the spading to be done is an excellent idea. Make a chart or schedule of the amount of spading you wish to do each day. In order not to overexert yourself, plan to do an hour's work a day

FIG. 3

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FIG. 4

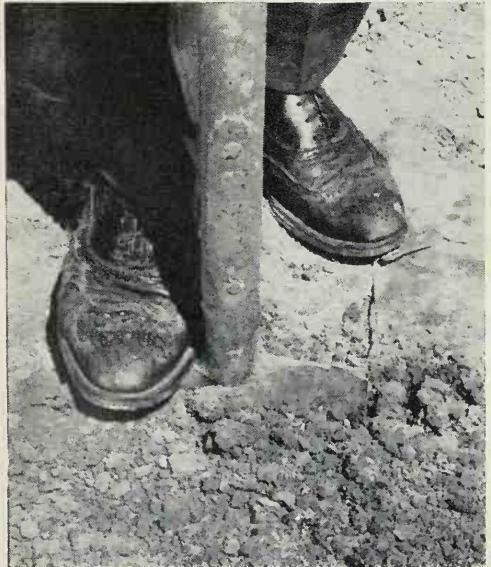
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After the spading is done, take a rake and work the smaller clods down to a proper granulation. At the same time smooth and level the surface of your garden

For general gardening purposes, you need to dig only one spade blade deep, which is 12 in. Trenching, which requires turning the soil over two spade lengths deep, is effective in preparing the soil for most perennials

FIG. 5

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ridges, thoroughly penetrating and mellowing the soil. When spring comes the ridges are merely leveled off, thus leaving the ground ready for planting. This is a fast and excellent way to improve the soil. Each year the digging can be done a little deeper, which will gradually increase the depth of fertile soil.

Limit day's spading: Ambition and eagerness to get started with the garden in the spring have their merits, but it is wise not to overexert yourself. Muscles can become very soft during winter hibernation, so they must be broken in with caution.

You can choose to do your spading either on a piecework basis or by the hour. If you decide to be a pieceworker, set a definite task for each day's work. You can mark off the area you intend to work at one time. Then open a trench at one end, depositing the dirt removed from it near the other end of the area. Then open up another trench and deposit the earth from the second trench, bottom up, in the first trench. The soil from the first trench can then be used to fill the second trench, and so on as in the previous description of "trenching."

If you are a clock-watcher who prefers to work by the hour, set aside an hour a day to do your spading. By putting in an hour of spading a day, you can complete work on 1500 sq. ft. in eight days. And you won't even have trouble with sore muscles. One word of caution should be inserted here about the depth of digging you do. *Don't skimp on how deep you dig.* Drive your spade straight down as far as the blade will go. If you want to take it easy, limit the area that you spade each day rather than lessening the depth to which you dig.

By limiting the day's spading there will be no cutting in on time ordinarily used on other outdoor pastimes. Or, if you like, leisurely take an inventory of your garden supplies, tools, fertilizers, spraying material and other necessities. Old edge tools can be gone over and sharpened for the coming season. New handles can be placed, and friction tape wrapped about that split place which always pinches your finger. After spading the area make a check on the requirements for a good soil—thin out the clumps insuring proper ventilation and remove weed roots.

With weeds gone, good drainage and aeration assured, plant food provided and the required structural conditions obtained, your resulting perfect or near-perfect soil is indeed a precious substance. And at long last you can scatter the seed, plant the bulbs or transplant the seedlings that will bring you bright flowers, smooth lawns, attractive shrubbery and trees or fresh, luscious vegetables.

Part 3

Planting . . .

WITH THE GROUND PREPARED, your lawn and garden are ready to receive plantings. In this part you will learn how to plant grass, trees, shrubs, vines, flowers, vegetables and herbs. You will learn what is best planted from seeds, and what grows best from bulbs, seedlings or cuttings. How to feed the new plants properly, and how to protect them from the elements are also topics of this section.



A beautiful lawn for your home

THE MAIN INGREDIENT of an attractive landscape that brings out the beauty of your home is an evenly smooth and green lawn. It can be thought of as the canvas upon which the picture of your garden is to be created. The flowers and hedges that border the lawn, the trees which are surrounded by the green turf and the ornaments which are placed on the grass—all these beautify the landscape only when an attractive lawn serves as a background. Since it is such an essential and permanent source of beauty, the construction and maintenance of a lawn deserve careful attention.

Establishing a New Lawn

Grading: If you are establishing a lawn for the first time on your property, your first and foremost task is to obtain a properly graded area upon which your lawn is to grow. Should the job of grading appear to be a difficult one, it is advisable to hire a landscape contractor to do the heavier work. These contractors are equipped with bulldozers, rototillers or similar cultivators with which they can accomplish the job in short order. You can usually hire these operators and their machines by the hour at reasonable cost.

One of your first considerations in grading is direction of slope. Generally speaking, northern and eastern exposures are the

most desirable. Hot dry weather affects southern and western slopes more, especially if water drains off the surface quickly.

In grading, it is best to have natural and gradual contours. Severe grades (Figs. 1 and 2) should be avoided wherever possible. It is difficult to establish and maintain a lawn on steeply graded ground because of washing out in wet weather and extreme drying in periods of drought. Moreover, steep grades complicate mowing. Every lawn should, however, have some slope, no matter how slight it may be, to insure runoff of excess water. A pitch of at least 6 in. to every 100 ft. of lawn is generally recommended. Ideal grading provides a slight slope away from the house in all directions, just enough to permit good drainage. Any change in grade should be as gentle as possible, unless an abrupt terrace is to be a part of the scheme of the landscape.

If a severe drop in grade is absolutely necessary, a dry retaining wall at the foot of the slope helps, as shown in Fig. 4. Otherwise, terracing is recommended so that the grass slopes will not be greater than one foot of fall to three of horizontal distance. Where there are several terraces, a series of dry wall embankments with grassed terraces between provides a suitable arrangement. To make the mowing of terraces easier, slopes at the top and bottom should

be leveled off gradually. The top of the slope or a terrace should be convex, and the bottom concave (see Fig. 3). With this arrangement the lawn mower will cut without scalping the crest or skipping the base.

The actual grading should be done in two parts. The first part consists in working with the subsoil grade. However, before the subsoil is touched, scrape off the topsoil and pile it to one side. Then grade the subsoil, giving it the same contour as the final grade. It will, of course, be lower than the final grade to allow an even depth in which the topsoil will be restored or added. The time to provide a good drainage system is when you are working on the subsurface grading. See page 28 for a discussion on drainage systems. This is also a good time to install any underground utilities such as a sanitary sewer, water lines to the house, major supply lines for lawn irrigation purposes, etc.

When you come to the surface grading, distribute the topsoil as evenly as possible, making sure that there are no thin spots to cause poor areas in the lawn. Special care should be given when grading slopes as there are often places that are cut and scraped severely, removing all topsoil and not replacing it in sufficient quantities. Never allow the subsoil to peek through. It is particularly important to have good depth of topsoil in lawn areas having considerable slope.

If there are large trees on the area to be graded, you will want to protect them during grading operations. Consult an experienced tree surgeon if the new grade is to be decidedly lower or higher than the natural grade under the trees. If the grade is to be lower, leave a sloping mound of soil around the base of the tree, extending out as far as the drip of the branches. The same amount of soil as was there originally should remain over the root zone of the tree. In the event that the grade is higher, provide some arrangement for a dry well or a fill of gravel and stone under the tree so the roots continue to get the necessary air and moisture.

Preparing the soil: The importance of good soil in producing healthy vegetation was discussed extensively in the previous section. This is as true for grass as it is for rare and delicate flowers. A good rule to follow in preparing the soil for grass is to prepare it as if it were to be a flower bed. Grass grows best in a light loam soil. A soil of this type absorbs and holds the necessary amount of moisture but is porous enough for the excess water to drain away and the air to penetrate it freely.

Before anything can be done to improve your soil, all rubbish—chunks of concrete, boards, plaster, etc.—should be removed.

BAD

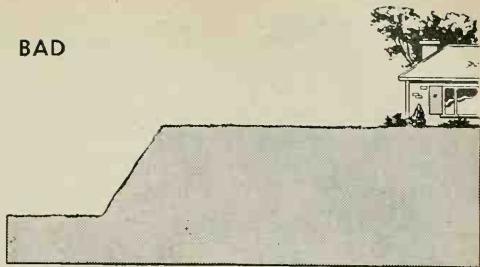


FIG. 1

A sharp grade, like the one above, should be avoided when establishing a lawn. There will be some washing away in hot weather and drying during drought.

FAIR

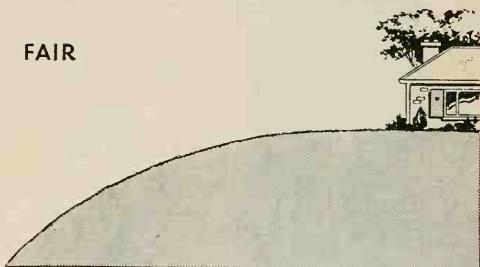


FIG. 2

The grade of the lawn above is slightly better. However, mowing this lawn will still provide a problem, as the top will be scalped and the bottom ignored.

GOOD

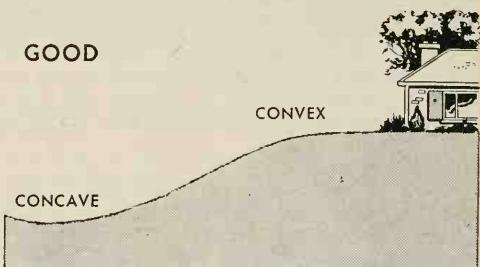


FIG. 3

Every lawn should have some slope to allow the excess water to run off. The above lawn has an excellent slope with a convex top and concave bottom.

GOOD

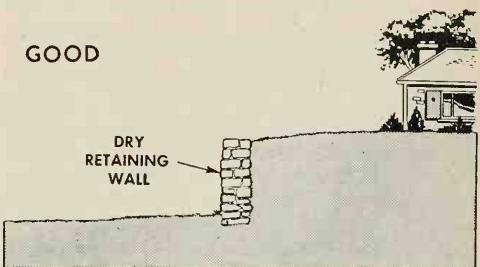
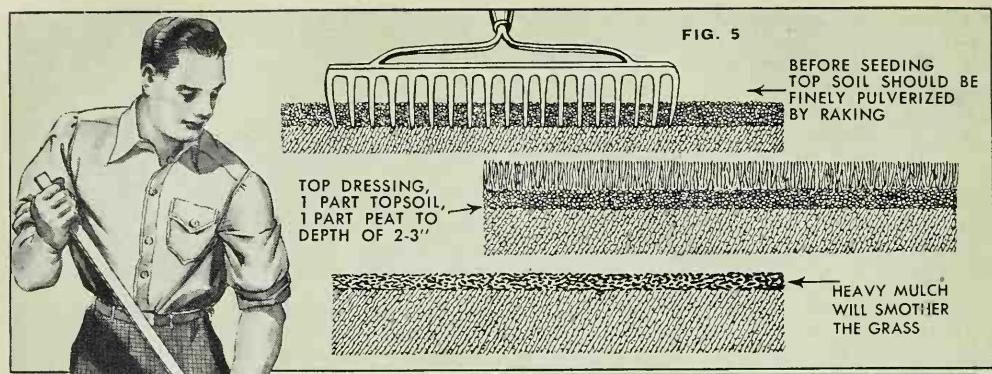


FIG. 4

A severe drop in grade should be avoided wherever possible in making a lawn. But if an abrupt terrace cannot be avoided, a dry retaining wall at the foot of the slope should be constructed to aid drainage.



Using a bamboo rake, if possible, spread the top dressing over the ground and work it into the soil. Fall is the ideal time for this operation several days before seeding.

Such trash will interfere with the movement of water in the soil and good grass will not grow.

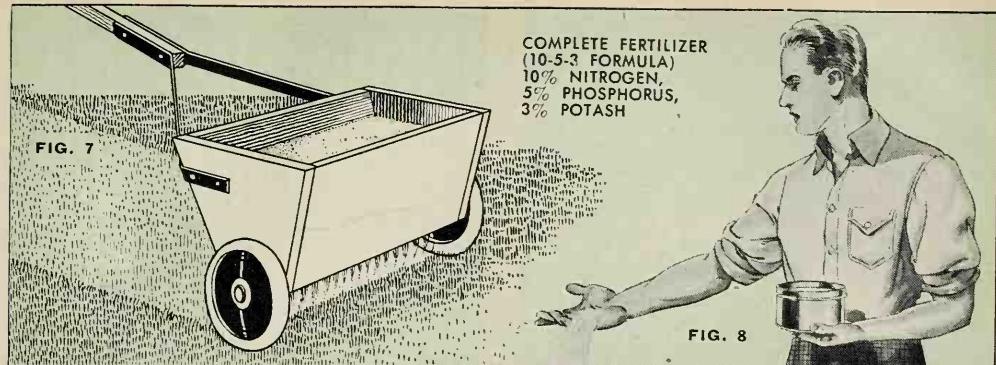
For the best results in establishing a new lawn, prepare the ground some time before the grass is to be planted. Early summer preparation for fall planting and autumn cultivation for spring sowing are recommended. By preparing the seedbed in early summer for fall seeding, there will be time for the weed seeds to germinate. These weeds can then be killed by subsequent cultivations before seeding. Likewise, fall preparation for spring planting allows enough time for many of the annual weed seeds in the surface soil to germinate before fall is over and be killed by winter freezing. Settling of the ground will take place over the winter and the alternate freezing and thawing of the fallow surface soil will make it more mellow.

The ideal soil for a lawn can be established by beginning to build up the soil a year prior to seeding. This is done by sowing the area that is to become a lawn in

soybeans, allowing the crop to grow for a season, then plowing the soybeans under in late summer.

If the soybean treatment cannot be given to the soil, it should receive a dressing of about 2 in. of well-rotted manure. Then it is to be plowed or spaded to a depth of about 8 in. and thoroughly raked and rolled. If the soil is dry after it has received these treatments, it should receive an occasional watering, but otherwise should be allowed to lie idle until just before seeding time. Remove all weeds that have popped up, after which cover the entire surface of the soil with a top-dressing (one part good topsoil to one part peat) to a depth of 2 or 3 in. Details of this operation are shown in Figs. 5 and 6. The mineral requirements of the soil should be met by adding 3 lbs. of nitrogen, 1½ lbs. of phosphorus and a still smaller amount of potash for every 1000 sq. ft. of soil area. This will amount to about 20 to 30 lbs. of complete fertilizer of an analysis of 10-5-3 or 12-6-4 per 1000 sq. ft., as shown in Fig. 7. Superphosphate is a good fertilizer which contains the three important elements. It should be mixed in the upper 4 in. of soil at the rate of 25 lbs. per 1000 sq. ft. This fertilizer will add enough phosphorus to the soil to last for a number of years. Other good sources of nitrogen which also carry small amounts of other elements are cottonseed meal, sheep manure, soybean meal and sewage sludge. Bonemeal is a suitable source of phosphorus and also contains a little nitrogen.

Now that the soil has been properly fed, it is ready for cultivation. The necessity for thoroughness here cannot be overemphasized. A finely pulverized seedbed is a must, and hand-raking will do the best job when the soil is in the best condition to be worked — that not-too-wet, not-too-dry stage illustrated on page 36. When all the stones and pieces of sod have been removed and a smooth seedbed is obtained, the soil



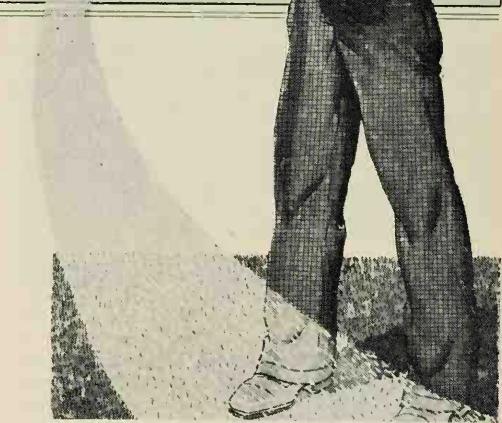
should be well watered. Then, when the surface has become dry again, it is time to seed, providing that at least a week has elapsed since the plant food was applied.

Seeding: The time element in establishing a new lawn is also very important. Even the most suitable seed mixture will usually lose out to a crab-grass lawn if it is sown in late spring or early summer. Crab-grass seeds are practically always present on the soil surface, and they are more suited to the dry, hot conditions of summer weather than are the more desirable grasses. The better lawn grasses, on the other hand, have the upper hand during the cool, moist months of early spring and early fall. If these grasses can get going during these seasons, they will have a head start on the crab grass and other weeds and can easily crowd out most of the competing weeds when summer rolls around.

Fall or spring—which is the best time for sowing grass seed? In practically every instance, fall planting wins out over that of spring. Fall is nature's chosen time for grass planting. In the first place, grass roots have a chance to grow more extensively in the fall. Moreover, weeds stop growing as the weather becomes cooler. That's when the young grass seedlings have the ideal moisture and temperature conditions for germination and growth and can grow without danger of being crowded out by the weeds.

However, if you do not have the opportunity to do your sowing in the fall, early spring is a good second choice. The earlier in the spring you seed, the better your results will be. You can start spring planting even if there is still snow on the ground, but it will have to be that late and light snow which is the last stand of winter. It is best to wait until the frost is out of the ground, since seed sown on snow or frozen ground may be carried away if there should be a quick thaw.

When you are ready to seed, choose a day when the air is quiet. The grass seed



Fertilizer may be broadcast by hand, as shown above, or with a seed and fertilizer spreader. The latter method gives a more even distribution

may be sown either by hand or with a spreader. You can obtain a more even and quicker distribution with a spreader (see Fig. 10), but hand sowing is almost as satisfactory, especially if your lawn area is small. If a seed mixture is used, it should be thoroughly mixed and divided into two portions. One part should be broadcast over the soil while walking lengthwise over the area; the other portion is to be sown while walking at right angles to the direction of the first sowing. From 3 to 5 lbs. of seed per 1000 sq. ft. will be needed to sow a new lawn.

It is difficult to state definitely the best procedure for covering the seed. The big question is whether raking or brushing is better than allowing nature to bury the seed by the alternate wetting action of rain and drying process of wind and sun. To be on the safe side, the gardener would be wise to give an assist to nature by a light hand raking or by dragging a flexible object, such as a weighted sack or steel door mat, over the area. This will spread the grass seed more evenly and at the same time cover it lightly with loose soil. The seedbed should then be rolled to bring the

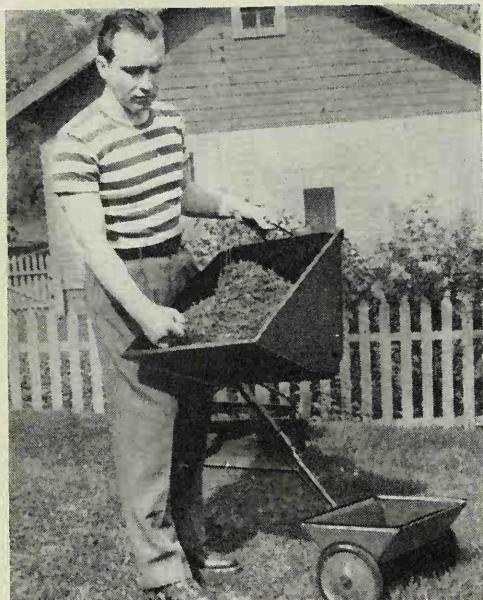


FIG. 9

The above seed and fertilizer spreader is also a yard cart. The hopper is removable and made of plywood reinforced with cleats at the joints, and fits snugly into the spreader hopper. The bottom is flat so that when mounted on the spreader it is high enough to clear the agitator. Rope handles on both sides of the hopper make it easy to carry to and from the cart



FIG. 10

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Although a seed spreader is a relatively expensive item, it is well worth the price because of the even distribution of grass seed you can obtain with it. Divide your grass seed mixture into two portions. Spread the first portion in horizontal strips, as shown above. Then operate the spreader over the same area at right angles to the first distribution

soil particles in close contact with the seed. A good practice to follow is to rake after the first part of the seed is sown and roll after the second sowing. A light roller is advised, just heavy enough to firm the soil but not pack it.

A top-dressing for the newly seeded area is optional. If you do use top-dressing, $\frac{1}{8}$ in. of screened topsoil or compost will serve the purpose. Avoid the use of raw peat moss, as the grass roots may grow up into the peat instead of down into the soil. Manure should not be used as a covering unless it is well rotted or composted. Straw may be used after summer seedings or to protect slopes from washing. Not more than 3 in. of loose straw should be used and this is to be removed as the grass gets well started. Covering the grass seed becomes more important when it is planted on a slope, as the seed is likely to wash away before it can take root. Burlap, cheesecloth or heavy fiber paper can be pegged down over a seeded slope (Fig. 11), providing that the cover is removed as soon as the seed sprouts so that the grass will not be smothered. Erosionet, a loosely woven open-mesh material, is another good covering. It can be left on the ground to rot away or taken off as soon as the grass is well started.

Moisture is essential to germinate the

seed as well as to keep the grass seedlings from perishing. The newly seeded area should be lightly sprinkled after it is rolled. Otherwise, seeding before a rain is a good procedure. Keep the newly planted lawn moist down to a depth of several inches at all times. In sprinkling the soil, use a fine spray so that the seeds will not be washed away or made to grow in patches. Even after the grass is up, it is important to prevent the soil from drying out. Many plantings are lost at this stage because the tender seedlings dry up easily and disappear after but a few hours' exposure to a hot sun. Two or three waterings with a fine spray may be required on bright days until the grass gets a good start. The new lawn has to be kept soaked so that the grass will be deeply rooted. Mere surface-watering will result in surface-rooting, and the first drought that comes along will kill much of the grass. The best way to water the lawn is to use a spray or canvas soaker. Fig. 12 shows an improvised sprinkler you can use. You can also prop the end of a hose on a forked stick, or on a device such as the one shown in Fig. 13, and let it spray. To test the depth to which the water has soaked, slip a knife into the soil and see how far down it slides readily. The sprinkler will have to be kept in one spot for at least two hours to give

most soils a good soaking. Another way to test the amount of water reaching the grass roots is to set cans at varying distances from the sprinkler and later see how much water collects in each can.

With plenty of moisture and moderate temperatures, the new grass seedlings will appear in about 7 to 10 days if there is redtop (see page 60) in the mixture. When the grass has reached a height of about 2 or 3 in., it is time to mow the new lawn. Never let the new grass grow longer than 3 in., because this can cause the lower part of the plants to turn yellow and the grass will be weakened. In clipping the new lawn, do not cut the grass blades shorter than 1½ in. If the grass is cut shorter than this, the development of the root system will be discouraged, and this increases the possibility of the plants being injured by extreme summer heat. By setting the mower blades at a 2-in. height, you will obtain the best results. Since new grass is thin and fine bladed, use the mower as gently as possible, and make sure that the cutting blades are well sharpened. Avoid damaging the lawn with the mower wheels. It is particularly important to stay off a new lawn when the ground is soft and wet as the grass seedlings are torn out easily.

After the first mowing, bare spots may show up in the lawn. These areas should be resown with seed immediately, regardless of the season, to prevent troublesome weeds and wild grasses from getting started. To assure that you reseed with the same blend of grass, it is wise to save some of it when seeding your lawn for the first time. A good way to store grass seed is suggested in Fig. 15.

If you choose to plant your lawn in the fall, you may wonder how you should protect it during the winter frosts. The answer is simple—you need do nothing. Young turf is not benefited and may even be harmed by protection from cold, so no winter covering is recommended. The young grass can withstand cold weather better than you think.

Sodding: This is an expensive way to establish a new lawn, but this practice is becoming more common and satisfactory around many new homes which have limited lawn areas. Sodding is desirable (1) on steeply sloped areas, (2) on borders of lawn areas, (3) at the edges of drives and walks, (4) on borders of planting areas to prevent soil from washing into them and to compose neat edgings, (5) where an immediate lawn effect is wanted and (6) upon small areas where subsequent care of a newly seeded lawn would be neglected or become too troublesome.

Good sod should be made up of densely rooted grass of the desired kind, and free

FIG. 11
Newly seeded grass on slopes and terraces should be covered so that the rain will not wash it away. Burlap bags can be pressed into the earth, as shown at the right. It will not be necessary to remove the cloth. It will rot

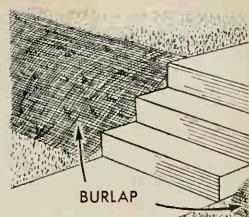


FIG. 12
Here is a good substitute for a garden-hose nozzle. It is made from a beverage can of the type that has a narrow neck. Solder a pipe coupling to the neck of the can and screw it on the hose. Punch several tiny holes into the can, the number depending on the spraying stream desired when the water is turned on. In watering a newly seeded lawn, only very minute holes should be used

FIG. 13
Your lawn hose and nozzle can be used to water a newly seeded lawn without the aid of a sprinkler if the arrangement pictured at the right is used. Merely bend a piece of heavy wire to support the hose in a vertical position. The device holds the hose so that it may be moved easily

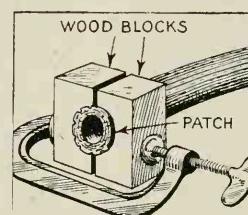
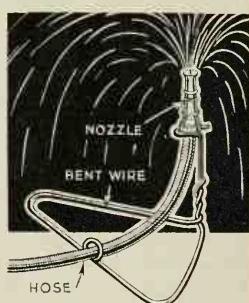
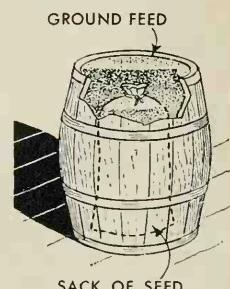


FIG. 14
A leak in a garden hose can be patched with the type of cold patch used on inner tubes. Use a clamp to put pressure on the patch while the cement is setting. If the hose is ribbed, it should be smoothed

FIG. 15
If grass seed is stored for any length of time, it should be protected from the moisture in the air to prevent spoiling. This is done by placing the sack of seed in a barrel and filling the barrel with ground feed. Pour a layer of feed over the bottom of the barrel before the seed sack is inserted



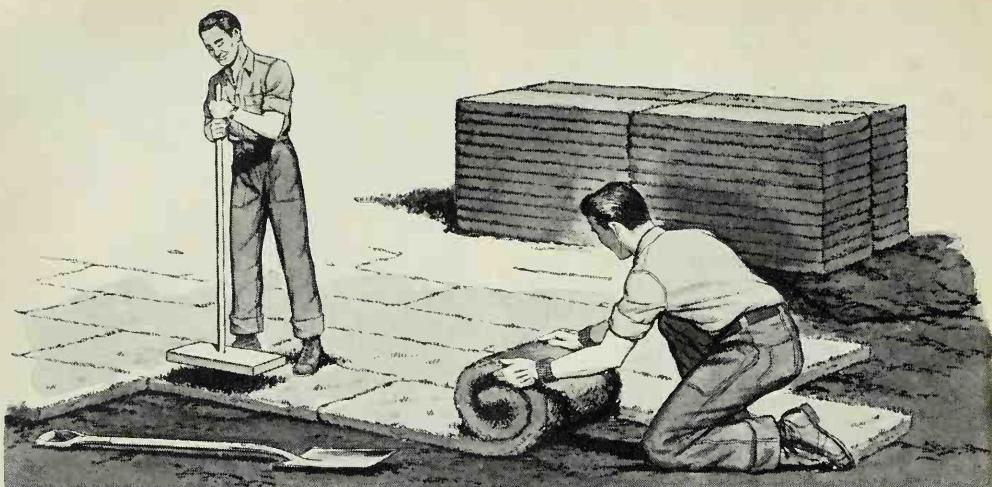


FIG. 16

After the ground has been well cultivated, lay the strips of sod snugly together but without crowding

from weeds and undesirable grasses. The strips of sod should be cut into pieces of convenient length and width and of a uniform thickness to insure an even surface when laid upon a well-prepared base. A width of one foot is about right with the thickness of sod varying from 1 in. for bent-grass sod to 1½ to 2 in. for bluegrass. Bent-grass sod can be thinner because of the extremely shallow-rootedness of this type of grass.

The best time of the year to lay sod is in the spring about the time when grass starts to grow. The seedbed is prepared as for seeding, and the strips of sod laid as in Fig. 16. They should lie together snugly but not be crowded. Then spread over the entire area a sandy loam topsoil, enriched with fertilizer and containing the seed of the native sod. About 1 cu. yd. of topsoil and 1 lb. of seed per 1000 sq. ft. of lawn area is the correct proportion. This mixture will settle into the crevices between the sod pieces, fill in the low spots and stimulate the grass growth until the roots become established in the soil below. The next step is to roll the newly sodded lawn to assure contact between sod and soil. The sodded area should then be watered. When sufficiently dry, roll the sod again to develop a smooth surface and to press the turf into contact with the soil below.

In sodding banks where there is a danger of the sod slipping, set the pieces lengthwise across the bank and hold them in place with wooden pegs. Peg each sod strip 1 to 2 in. below each upper corner and also at a point midway between corners. Drive the pegs through the sod and into the bank, deep enough so that the tops of the pegs will be slightly below the cutting blades of a mower.

Growing grass under trees: Establishing and maintaining a lawn under trees present a special problem. Here there are limitations in sunlight, plant food and moisture. Certain species of grasses, such as chewsings fescue and woodlawn meadow grasses, can thrive with a minimum of light.

Grass under trees suffers from lack of moisture and plant food because shade trees withdraw these elements from the surrounding soil very rapidly. Therefore, the soil under trees has to be heavily and frequently enriched and watered to maintain grass.

Winter lawns: In the southern part of the United States, it is possible to maintain green growth on the lawn the year around. The winter grasses are, of course, different in species from those that grow in the warmer seasons. A winter lawn is, therefore, treated as a separate and annual crop. The grasses used are shallow rooted and will not forage deep enough into the ground to injure or disturb the permanent grasses. A complete plant food is needed to supply the winter grasses with nutrients.

These steps should be followed to establish a winter lawn. First, cut the grass on your permanent lawn close and remove the clippings early in the fall. Then apply a complete plant food evenly on the surface, using about 4 lbs. per 100 sq. ft. of area. Sow winter rye grass seed evenly, rake it into the soil lightly and soak it down thoroughly. Daily watering is required until seed germination. When spring arrives and the permanent grasses start to grow, the winter grasses can be easily raked out.

When you are raking, watch for weeds that were hardy enough to last the winter. These weeds are harmful to a healthy soil and lawn.

Renovating an old lawn

IF THERE IS A LAWN already established on your property, you may be faced with the task of trying to improve it. It may be that your lawn is so poor that you are debating with yourself whether to dig it all up and start from scratch or to try to build up what you have. Your final decision will have to rest on what attempts you have made in the past to improve your lawn. If repeated attempts to bring about a healthy, attractive lawn have failed, there is probably something fundamentally wrong. It would be useless to continue the same practices to improve your lawn when they have repeatedly failed you in the past. Instead, you should make an effort to find out what is wrong and correct it.

Poor soil might be the cause of a poor lawn. Therefore, your first task would be to examine the soil. You can do this by merely digging up a sizable chunk, going down into ground at least 10 or 12 in. and spading

up the sample. Examine this chunk of soil carefully. Is it yellow or almost white when dry? If so, you probably have a stiff clay soil on your hands. Grass roots would make little headway in such soil because of poor drainage and aeration. On the other hand, the soil may turn out to be stony and gravelly. This is the type of soil from which the water drains away so rapidly that neither moisture nor nutrients can be absorbed by the grass roots.

If your soil turns out to be one of the two extremes mentioned above, it might be best to remove 6 to 8 in. of the soil and import good topsoil. Or, you can make your own topsoil by preparing a mixture of soil, leaf mold, fertilizer, etc., with a sifter-mixer of the type shown in Fig. 17. However, this may be impractical where the lawn area is large. Your alternative then will be to work in soil of opposite texture and some organic matter with the soil.

Here is a combination soil sifter and mixer that you can build yourself to prepare topsoil for your lawn and garden. It will accommodate a fairly large quantity of soil, leaf mold, fertilizer, etc. in one mixing. The frame is mounted on four legs set into the ground and diagonally braced. The screen frame rides on four roller-skate wheels and the track is protected by a sheet-metal guard. After good soil has passed through the screen, the siftings are dumped into a container in the manner indicated in the drawing. Flat-iron stops prevent the skate wheels from running off the end of the sifter track.

FIG. 17



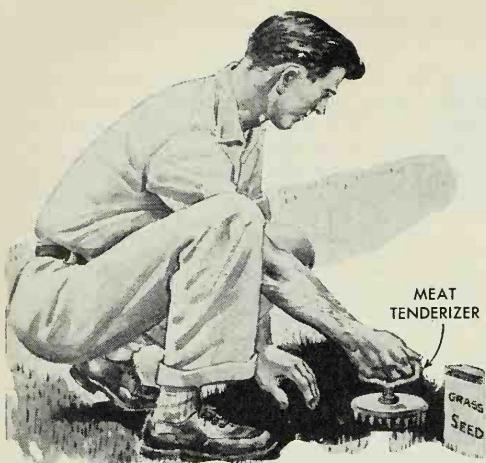


FIG. 18

Reseeding to patch thin spots in the lawn is hard to do without disturbing the grass. A household meat tenderizer is ideal for this purpose, as shown above. When pressed into the soil, the tenderizer loosens the soil and leaves small holes for the seed, but does not uproot the grass presently growing in that spot.

Improper grading also may cause you to have a poor lawn. A flat lawn may sag in spots so that puddles collect and drown the grass. On the other hand, the slope may be so severe that soil washes away during rains and droughts also take their toll. The solution here would be to spade up your old lawn and regrade the area for a new one. Install a drainage system if necessary and provide a sufficiently deep topsoil of good texture.

Cultivation: In time, many good soils become too compact because of trampling and settling. In such situations, spade up or plow the ground, incorporate material to lighten the soil and feed it with plant nutrients. If only limited spaces, such as low spots or areas under trees, need to be treated, the soil can be loosened and cultivated by 6 to 8 in. deep perforations. Drive an ordinary spading fork down as far as it will go into the ground and work it back and forth to enlarge the openings. The fork should be inserted at close intervals, the openings being made every few inches. Brushing sharp sand or compost into the holes will assure better movement of air and moisture through the soil.

Having decided to turn over your old lawn, you may wonder how deep you should spade. This will depend on the depth of the topsoil. Only go as far down as your topsoil extends, taking care not to bring up any subsoil. As long as you are going to the trouble of renovating your lawn, do a good job of it. Fill in all low spots with good topsoil and remove any high spots

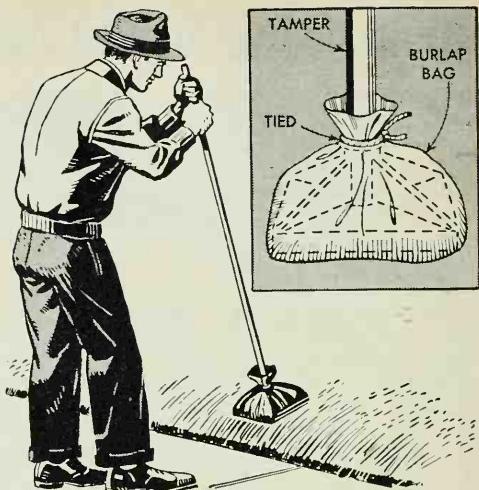


FIG. 19

When tamping grass seed into the soil, a tamper often becomes difficult to manage if caked with wet soil. Burlap wrapped over the head of the tamper, as shown above, will help this situation by keeping the wet soil from sticking to the tool. Once in a while the cloth may have to be removed and cleaned.

by taking away some of the subsoil and then replacing the topsoil.

Maybe you won't have to renovate your lawn completely. The poor condition of the lawn could be due to improper management in feeding, watering, mowing, weeding and controlling of pests and diseases. If this is all that is the matter with your lawn, your problems can be solved by proper surface treatments. These operations are discussed a little later on.

Fall is also the best time of the year to begin work in building up a lawn which is already established. Do not start off on the wrong foot by trying to rake off the dead crab grass. Experiments have shown that raking grass often does more harm than good, especially on certain species, such as bluegrass. Gardeners are apt to rake the crab grass vigorously, trying to check or eliminate the growth of this undesirable grass. If all the crab-grass seed could be removed along with the dead leaves and stems, raking would be justified. But this is not possible. Instead of removing crab-grass seeds, raking merely threshes, and a large number of seeds are actually helped to be well planted by this process.

It is true that dead crab grass on the lawn produces unsightly brown patches, but this looks no worse than the bare spots in the lawn that would result if the dead grass were removed. Moreover, the presence of the dead material can be an advantage in reseeding. You can sow your grass seed right into the dead crab grass, which acts

as a moisture-conserving mulch during the winter, thus aiding germination of the seed. By the time the new grass starts to grow rapidly the following spring, the dead crabgrass plants will have practically disintegrated and the soil profits from the resulting addition of organic matter.

Where there are bare spots to reseed, loosen the soil about 2 in. deep and rake the surface to a fine, even texture. As Fig. 18 shows, a household meat tenderizer can be used to prepare the lawn for reseeding. Sow the grass seed evenly and lightly over the thin and bare spots. Then rake the area very gently and tamp the loosened soil down a little with the back of a spade or a tamper. To keep the soil from sticking to the tamper, wrap a piece of burlap around it, as shown in Fig. 19. Whether you are sowing seed into patches of dead crab grass or onto bare spots, this area must be watered thoroughly. Not until germination of the seed is complete should the surface be allowed to become dry again. This will require at least two sprinklings daily.

The addition of plant food is of first importance in improving an established lawn. As has been pointed out before, the natural source of humus in the soil is constantly being exhausted and must be replaced if vegetation is to grow successfully.

A relatively new treatment for grasses is a hormone feeding, which strengthens root systems. Lawns may be watered with hormone solutions during the spring and fall months, using a siphon attachment on the garden hose as in Fig. 20. To assure uniform results by this method it is necessary to apply a given amount of the solution per 1000 sq. ft. This amount, varying with the brand, will be recommended by the manufacturer. Measure the lawn and locate the areas with markers. Then sprinkle uniformly, taking care not to soak or flood the areas. When working on a steep, sodded slope or terrace, keep the bulk of the water on the higher levels as it will seep down the slope. Use a light, spreading spray under low pressure and work on a still day. The two sample sods in Fig. 21, from treated and untreated plots, show the superior root system of the treated specimen. The time interval was the same for both specimens.

There are a number of other plant foods that can be recommended. A complete fertilizer of a 10-5-3 or a 12-6-4 analysis will serve the average lawn. It should be applied at the rate of about 20 to 25 lbs. per 1000 sq. ft. Dump the fertilizer on the lawn in small piles here and there. You can either broadcast the fertilizer with a shovel as in Fig. 22 or spread it with the back of a rake as in Fig. 23. Work the plant food down into the turf with a rake or a stiff broom. Dragging the area with a flexible



FIG. 20

To treat the lawn with a hormone solution, extend a siphon attachment from the bucket containing the solution to the garden hose, as illustrated above, and spray lightly. The lawn should be sprinkled uniformly, taking care not to soak or flood any areas. The operation is best done on a quiet day

The illustrations below show the results of an experiment in which one patch of bluegrass was given the hormone treatment while the other was left alone. The superior root system, seen in the treated grass at the right, will produce better grass over the years

FIG. 21





FIG. 22

An effective way to broadcast top-dressing over the lawn area is with a shovel, as shown above. The plant food is to be distributed as evenly as possible



FIG. 23

The back of an iron rake can also be used to spread the fertilizer, as above. The fertilizer should be dumped on the lawn in small piles here and there

metal door mat is another satisfactory method. Watering the fertilizer into the lawn is the next step.

Ammonium sulphate is a good nitrogen fertilizer to use where the soil is already supplied with phosphorus. It comes in concentrated form and so should be either dissolved in water and sprinkled over the lawn or mixed with a little soil or top-dressing and broadcast over the area. Use about 5 lbs. of ammonium sulphate to 1000 sq. ft. of lawn. If allowed to remain on the grass blades, this fertilizer will cause some injury, so it should be spread just before a rain or washed into the soil with a spray from the hose. If it is not convenient to water the application, the ammonium sulphate or other commercial fertilizer may be scattered when the grass is dry and brushed into the turf with a broom or bamboo rake. Ammonium sulphate is used chiefly because of its quick action. New and vigorous growth can be observed in a lawn 10 days after it has received an application of this fertilizer. This stimulation of growth continues for a month or six weeks and then becomes exhausted. The only disadvantage in the use of ammonium sulphate is the acid condition that develops in the soil if used continually. Also, certain experiments have shown that the use of ammonium sulphate alone has a somewhat harmful effect on bluegrass turf.

Applying fertilizer in the fall encourages the growth of desirable grasses when crab grass and other weeds offer no competition, and this helps to strengthen the turf. In order to produce prompt effect, the fall feed should be in chemical rather than organic form.

Early spring feeding of the lawn is considered the most effective. At this time of

the year in many parts of the country the alternate freezing and thawing leaves the soil pitted and honeycombed. This leaves the ground in a perfect condition for the plant food to seep down to the roots where it is needed. If fed just before the final thaw, the lawn won't even require watering to dissolve the plant foods. Spring rains, or tardily melting snows, take the food deep into the ground, encouraging the grass roots to delve down after it. This early root activity before top growth starts assures the lawn of a root system deep enough to sustain it during the hot, dry periods of summer.

If you are not able to get that early spring start in feeding your lawn, it is still not too late to do so later on in the spring. It is advisable to apply plant food before the grass starts to grow, but it is still permissible to feed the lawn after leaf growth has started. Sprinkle the fertilizer on when the grass is dry; then soak the lawn good with a hose or sprinkler to wash the plant food off the grass and into the soil. This is done so that the plant food will not "burn" the grass leaves, a condition which is not actually serious except that it turns the grass brown temporarily. Whenever it is that you apply the fertilizer, see to it that the lawn is cut very short so that the plant food will contact the soil easily. Feeding the lawn in the summer is not advised, because this would encourage the growth of crab grass and other weeds rather than the desirable grasses.

Rolling: An important operation, but one which many gardeners neglect, is rolling the lawn. This process is often overlooked because a roller is an expensive item for the amount of use it gets. Nevertheless, a roller is almost essential in producing a

good lawn. By rolling the established lawn in the spring, you can press back into the soil the grass roots which have been heaved up by the freezing and thawing. This makes for better growth of the grass and smooths the surface at the same time.

The correct time for lawn rolling is just after the frost has left the ground. Then the surface is soft and moist but not wet. Wait until all danger of alternate freezing and thawing is past. Under no circumstances should you roll the lawn when it is too wet, for this is far worse than no rolling at all. The earth should be about the same consistency as it is for spading—a soil that is firm when picked up but will crumble easily when tapped lightly. One rolling in the spring is sufficient for the year. The correct rolling technique is shown in Fig. 24. A soil which tends to be loose and sandy can stand more rolling than a heavy soil. Where the soil is a heavy clay which forms a crust as it dries, rolling may do more harm than good.

The roller should be only heavy enough to firm back any grass which has been heaved up. About 100 lbs. of weight for each foot of roller width is recommended for ordinary use. Either a concrete roller or one of hollow metal half-filled with water or sand will serve the purpose well.

Automobiles backing into grass edges can leave ugly-looking gouges. These can be mended by cutting out the section marred by the gouge in a square or oblong piece. Reverse this section and replace it, as in Fig. 25. This leaves a neat edge on the outside. The damaged section is to be filled in with sifted loam and reseeded with the proper kind of grass seed.

If the ruts in the lawn are not too deep, they can often be removed by the use of a lawn roller, a thick plank and a sledge hammer, as shown in Fig. 26. When the ruts are too deep for this treatment, cut along both edges of the rut with an edge cutter. Roll back the turf in the rut, cutting carefully under it with a spade to loosen it. Then loosen the packed soil underneath, add some topsoil and replace the turf.

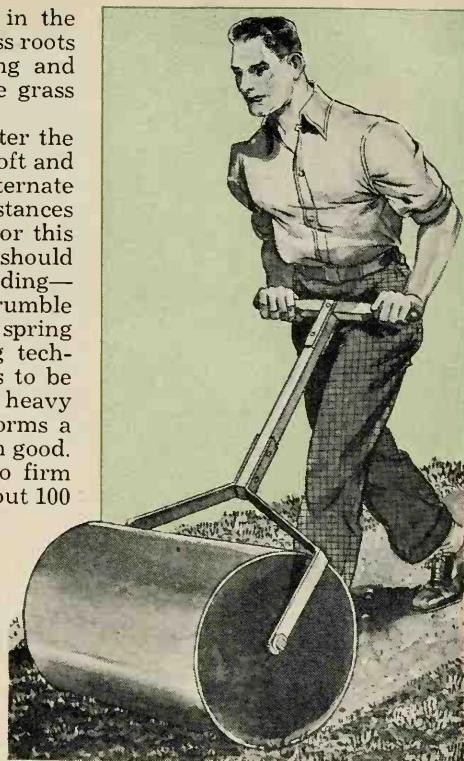
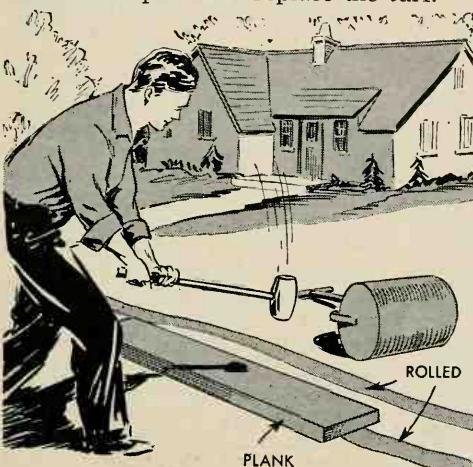


FIG. 24

In rolling a lawn, push the roller firmly in a forward rather than a downward position. Under no circumstances should the lawn be rolled when it is wet

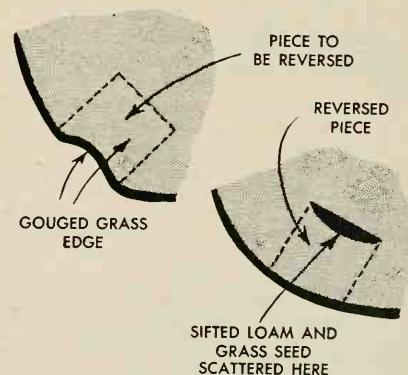


FIG. 25

To mend a gouge at a lawn edge, cut out a square piece of sod, as shown above, and reverse it. Fill in the damaged section with sifted loam and reseed with the same grass mixture as used for the lawn

FIG. 26

Ruts made in a lawn by the wheels of a car or truck can be removed without leaving any noticeable trace if the defaced area is rolled to make it compact, after which the ruts are pounded out with a thick plank struck by a sledge hammer as illustrated

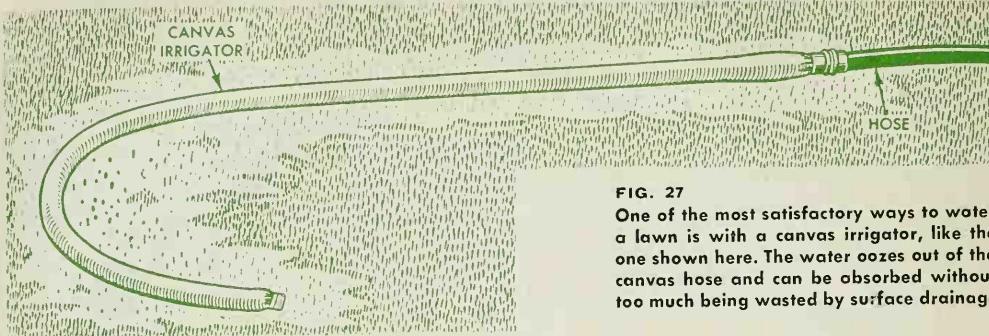
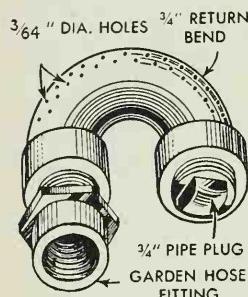


FIG. 27

One of the most satisfactory ways to water a lawn is with a canvas irrigator, like the one shown here. The water oozes out of the canvas hose and can be absorbed without too much being wasted by surface drainage



that sprinkling the lawn so that the water wets only the upper inch of soil encourages the growth of the undesirable plants while the good grasses do not benefit at all. This is particularly true during the hot, dry mid-summer months, during which crab grass and other weeds grow vigorously and such grasses as bluegrass lie dormant. Moreover, if the deep grass roots do not get water, they have to come up to the surface for it. This results in surface rooting, and the first dry spell that comes along can take a heavy toll on the desirable grasses.

The amount of water needed by the lawn will depend on the type of soil in which it is growing. Loam and clay soils retain water well and can keep the grass roots supplied with enough water so that droughts can be withstood. On the other hand, where grass grows in sandy or gravelly soils, the slightest drought dries the soil completely and even weeds may be killed along with the grasses. The exposure of the lawn and the temperature and rainfall also influence the amount of water needed by a lawn. Also closely connected with watering is the height to which the grass is cut. A closely clipped lawn increases the rate of evaporation.

Most home gardeners are apt to resign themselves to a dry, straw-like turf during the hot summer months. It is true that the dormant, dead-looking bluegrass lawn eventually becomes green again when the weather becomes cooler and more moist in the fall. But why not enjoy a lush, green lawn during midsummer when it gives such a soothing effect? This is possible! A glance at golf-course putting greens, which retain their green beauty throughout the summer year after year, is evidence enough that lawns can be kept green even in hot, dry weather. To do this, of course, means a carefully planned watering program plus proper feeding. Don't expect miracles even with the best-planned and most religiously executed watering program unless the soil is kept properly fed and healthy. Browning is often caused by diseases, attacks of insect pests and even improper mowing.

In using a sprinkler to water the lawn, allow it to stay in one spot for at least an hour, or even two, or until the water soaks down to a depth of 6 to 8 in. Then move it to another spot for some more sprinkling, and so forth until the entire lawn area is well soaked. This may require as long as four to eight hours and even more, but once the soil is well soaked it won't require another watering for days. The spray of water should be light enough so that the soil can absorb it readily. A fine mist does not work well because it is easily blown by the wind. Neither can a coarse stream be used, because it washes the soil and puts the water

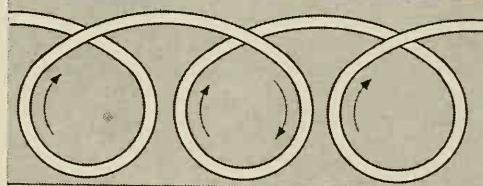


FIG. 31

If you do not keep your garden hose conveniently wound around a reel when not in use, you are probably one of those gardeners whose hose twists annoyingly as it is pulled from the coil. But there is a way that you can prevent this twisting. When you put your hose away, form the hose coils as shown in the detail, laying them one on top of the other. You will note that each succeeding loop is made in the direction opposite that of the previous loop

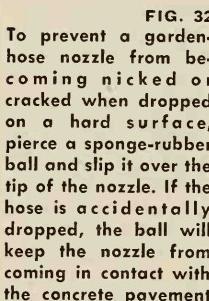


FIG. 32

To prevent a garden-hose nozzle from becoming nicked or cracked when dropped on a hard surface, pierce a sponge-rubber ball and slip it over the tip of the nozzle. If the hose is accidentally dropped, the ball will keep the nozzle from coming in contact with the concrete pavement

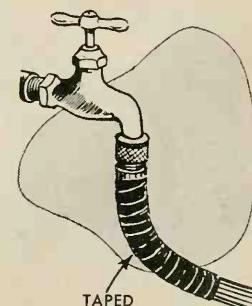


FIG. 33
Repeated kinkings of a garden hose near the faucet connection eventually break the hose and cause a leak. To prevent this, apply a tight spiral wrapping of friction tape around the hose so it extends a foot or so from the connection. Be sure the tape covers the place where the hose kinks

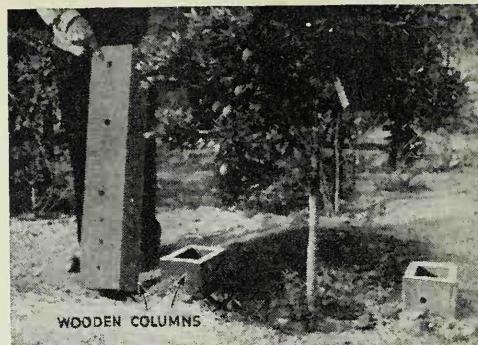


FIG. 34

By supplying water to trees through wooden columns, they will not take as much moisture from other plants

on too fast. If you can get the sprinkler to provide the effect of a slow, easy rain, the water will soak in as it falls and not flood the ground and run off the slopes. In selecting your sprinkler, choose one which is suitable for the size and shape of your lawn. A sprinkler which does not have to be moved too frequently is, of course, the best kind to have. As for caring for your garden hose, Figs. 31, 32 and 33 make a few helpful suggestions.

An automatic underground sprinkler system is a time and labor-saving device which can water a lawn evenly and efficiently. However, even this convenient method can be abused. Because it is so easy to turn on, there is danger of overwatering. This may not harm lawns growing in sandy soils, but too much water in a compact, clay soil can easily drown the grass roots.

Lawns other than bent-grass lawns (see discussion on page 62) can be watered at any time of the day. It is true that the high temperature of midday causes higher evaporation, thus resulting in waste of water to some extent. Therefore, most people prefer to do their watering in the morning, late afternoon or evening.

There are special problems that arise in lawn watering. The watering of a newly seeded lawn bed requires special attention. Droughts do not harm seed, but germination is hastened by keeping the soil moist.

A problem arises when there is too much water in a compact soil. This often happens when the spring has been too wet. The result is a waterlogged soil in which the deeper roots die because of poor aeration. When this happens the remaining grass depends on the upper surface of soil for its food and water. This activity in the surface soil causes it to dry rapidly, and moisture must be replaced constantly to keep the grass alive. If you nurse the grass along by daily watering with a fine spray, you can urge the roots to go down deeper and the watering can become less frequent. Where grass roots have been weakened by insect attacks, a similar program can be launched to bring the grass back to health.

Tree-shaded lawns also present a problem in watering. Being protected from the sun, these lawns lose less moisture through surface evaporation. But the tree roots draw water from the undersoil, leaving little moisture in it for the grass roots. It's

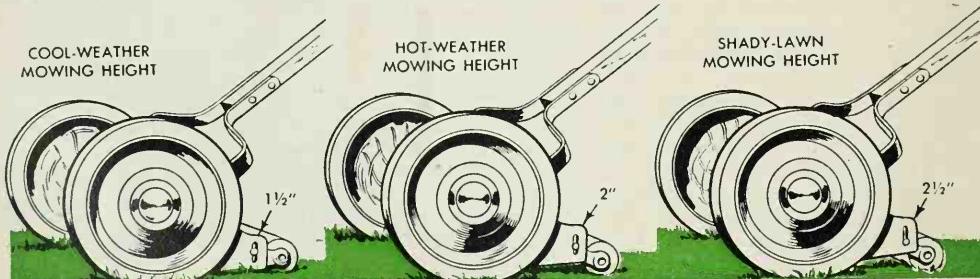


FIG. 36

The height to which you mow the lawn is very important. As shown above, the grass should be kept at a $1\frac{1}{2}$ -in. height during cool weather and increased to 2 in. in hot weather. Always keep shady lawns $2\frac{1}{2}$ in. high

a good idea to examine the soil under trees from time to time. If the undersoil is found to be dry, replace the water by slow, penetrating applications. You can also cut down the competition between the trees and the grass for water by providing special means to get a sufficient supply of water to the trees. When a young tree is planted, its roots can be assured of a plentiful supply of water if a length of 6-in. pipe is placed in the hole near the roots, as shown in Fig. 35. The pipe is filled with water, which will be fed directly to the roots instead of seeping through the ground to be absorbed by the soil. Another way to provide a water supply for trees is to sink two wooden columns about 3 ft. into the ground on each side of a small tree, as pictured in Fig. 34. Water is run into the columns and passes into the ground around the tree roots through holes drilled in one side of each column. The holes are covered with screen wire to keep the dirt from falling into the columns.

Mowing: One of the most common mistakes made in mowing is to cut the lawn too short. It must be realized that the grass blades play a vital part in transforming food into energy for growth. By continually cutting off these blades, this function is severely crippled, and the grass has a hard time thriving. On the other hand, if you allow the blades to grow too long, they become spindly and form a thin, weak lawn. There is a happy medium between these two extremes where mowing causes the least injury and yet gives a neat appearance to the lawn. You can attain this medium by cutting the grass to 1 in. in cool weather and raising it to 1½ or 2 in. when the atmosphere becomes warmer and drier. If the turf is kept at this height, frequent cutting will not harm it, and the lawn can be kept uniformly trimmed to give it a well-groomed appearance.

The attractiveness of the lawn is the direct result of high cutting, as it is the grass blades that give the green color to the lawn rather than the yellowish stems which would be exposed were the grass clipped closely. High cutting also has a lasting influence on the general health of the grass. Longer top growth (within reason, of course) means a more extensive root system, which in turn can reach more food and moisture. The blades of grass kept over an inch tall also provide shade to reduce the evaporation of soil moisture.

High cutting is especially important in the case of shaded lawns, where sunlight is limited and the longer growth is needed to help combine air, light and soil nutrients necessary for plant growth. Densely shaded lawns should not be cut shorter than 2½ in., with 3 in. being an even more desirable

FIG. 37
If you have difficulty cutting grass along flower or hedge borders with a regular lawn mower, an edge clipper, like the one at the right, will come in handy. An implement of this sort will enable you to trim the edges neatly without damaging any of the plants in the border

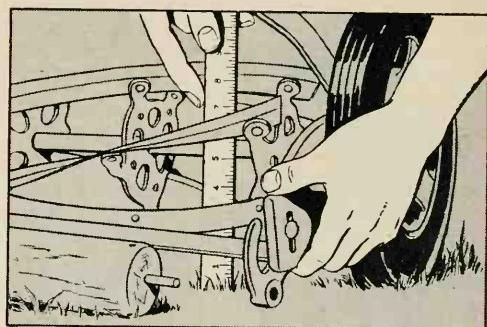
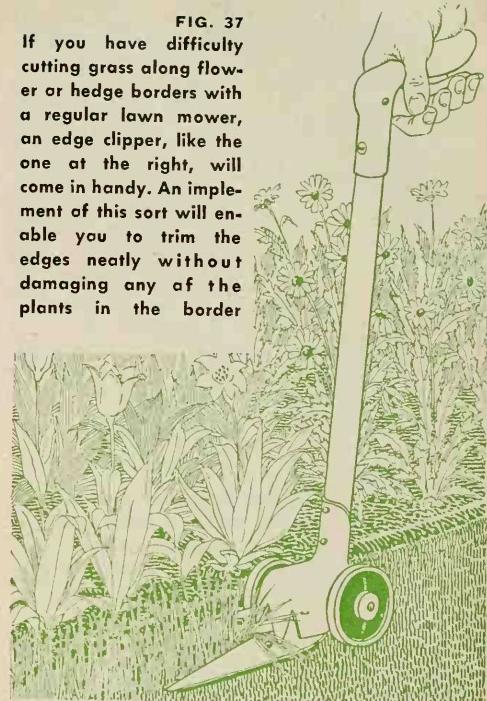


FIG. 38
Measure from the cutting edge of the bedknife to the ground to find out at what height the mower will cut

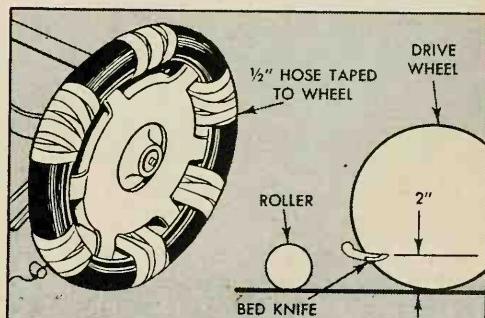


FIG. 39
Wrap a length of hose around the mower wheel, as shown above, if the bedknife cannot be adjusted



FIG. 40

If you cannot adjust the height of the cutter bar on your lawn mower, fit the roller mounting brackets with flat-iron extensions. First, slot and drill two pieces of flat iron as shown in the detail. Then ream the threads out of a small nut and weld it over the hole to serve as a bushing for the roller shaft. The offset in the bracket extensions is bent to suit the length of the roller. Bolting the slotted portions of the extension to the original roller brackets permits the adjustment to be varied to fit seasonal needs.

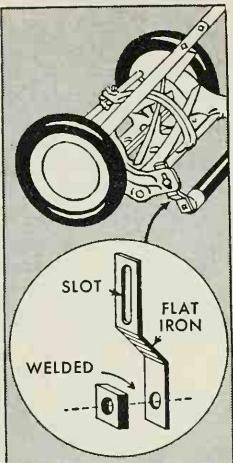


FIG. 41

A broom rake, like the one above, can be used to rake grass clippings off the lawn. In using this kind of a rake, it is often necessary to stop and clean the teeth. This nuisance is overcome and the work speeded if a rubber guard is slipped over the teeth. It is cut from a rubber inner tube and the holes are spaced so they will not spread or pull the teeth together.

height. Fig. 36 shows average seasonal mower adjustments.

It often happens that well-fed and well-watered lawns get too thick after a few years of moderately high cutting. In such a situation, mow the lawn fairly close in cool weather, but continue to use the high cut in periods of extreme heat. Bent-grass lawns are the exception to this high-cutting rule. They should be kept at about $1\frac{1}{2}$ in., or better, a $1\frac{3}{4}$ -in. height.

Adjusting the mower so it will cut at the proper height is illustrated in Fig. 38. First place the mower on a flat, hard surface, such as a walk or a garage or basement floor. The next step is to loosen the side brackets at the ends of the roller. As you extend the roller bracket downward, the roller is lowered and the bedknife in front is tilted up. When the cutting edge of the bedknife measures $1\frac{1}{2}$ to 2 in. (or whatever length you are going to cut the grass), tighten the bracket bolts that were previously loosened.

If your mower cannot be adjusted to cut high enough, you will have to obtain longer brackets or extensions (see Fig. 40), from the manufacturer or have them made at a machine shop. Another alternative is to lift the mower wheels by wrapping rubber hose or a $\frac{1}{2}$ -in. rope around each wheel rim of the mower (Fig. 39). You can also replace the old wheels with two that have larger diameters.

Naturally, the blades of the mower should be sharp. If not, the grass will be crushed and torn instead of being severed cleanly. Bruising the grass in such a way leaves a brownish cast to the lawn. The time and frequency of mowing are also important. Whether you are to mow twice a week or once a month depends on the condition of the grass and the previous mowing schedule, the rapidity of growth and the weather. If you have mowed to $1\frac{1}{2}$ in., let the grass grow to at least 3 in. before you mow again. If the grass has been cut to $\frac{3}{4}$ or 1 in., it is better to raise the mower by stages, that is, raise it to $1\frac{1}{2}$ in. and clip the grass a couple of times when it is 2 in. high, then raise to 2 in. and clip when the grass is 3 in. high. Coming into the hot, dry summer months, the frequency of mowings should be determined by the height and condition of the grass and not by intervals of time. In general, it is better to cut too often rather than let the grass get so high that bleached stems are evident after the cutting.

Whether the grass clippings should be removed or not depends on several factors, including your own personal preference. It is interesting to consider the abundant crop produced by grass plants. If you were to save or keep track of all the grass clippings

which come from your lawn in one season, you would find the yield to be something like 36 in. deep. Now this is an immense crop, and one can easily imagine the huge amount of plant food that was taken from the soil by the grass roots and up into the blades to produce this crop. The soil cannot continue to yield so bountifully unless plant food is restored to it.

Grass clippings left on the lawn provide, to a small extent, the needed plant food. These clippings dry out, decay and work their way down into the soil. Besides contributing plant food to the soil, clippings also act as mulch to reduce surface evaporation, thus keeping the soil cooler and more moist.

If the clippings are long, say over an inch, by all means remove them. This can be done either by raking (Fig. 41) or by using a grass catcher when mowing. When the clippings are over an inch long, they do not work their way into the soil readily, and as they dry out they leave a brownish cast to the lawn. Also, if the weather is damp or the outlook is for rainy days ahead, grass clippings should be removed. Damp, heavy clippings will mat down and may cause mold and disease to develop in your lawn.

All things considered, removal of clippings from the lawn is of minor importance. Should the clippings lie in strips and make the lawn unsightly, then remove them. Whenever the sight of the clippings is annoying, you can remove them if just for appearance' sake. It is easier to rake away the clippings after they have been on the lawn for a day or two, as they will have decreased in bulk by drying.

Raking and mulching: Leaves should be raked off the lawn, especially if they tend to form a heavy mat. This is so the grass can be encouraged to grow freely in the fall, and a mat of leaves would hinder growth. Some of the leaves can be raked around shrubbery to act as mulch. The remainder can be piled in some corner of the yard to decompose and form leaf mold, which will be useful later on to improve the garden soil. The excess leaves should, of course, be collected (see Figs. 42 and 43) and destroyed.

A winter mulch on the lawn is unnecessary, and its unsightliness is further reason why it should not be used. However, a light covering of straw can be used to cover a new bed of grass seedlings. This will protect them from being heaved out of the soil by the alternate freezing and thawing that take place in the winter. It is a waste of time to put manure on the lawn during the fall or winter, as the soluble fertilizer elements are leached out and washed away before they can do any good for the soil.



FIG. 42

A gunny sack hung from a circular frame, as illustrated above, is a convenient place to keep leaves until you are ready to burn them. The top of the sack is impaled on six hooks evenly spaced around the rack. When the sack is filled, it can be easily unhooked and carried away to dump its contents



FIG. 43

The wheel frame shown above is the answer to your leaf-hauling problem. The frame is 5 x 7 ft., has wire mesh tacked to the underside of it and two wheels attached to it. Leaves are raked onto the frame in the same manner that dirt is swept onto a dustpan

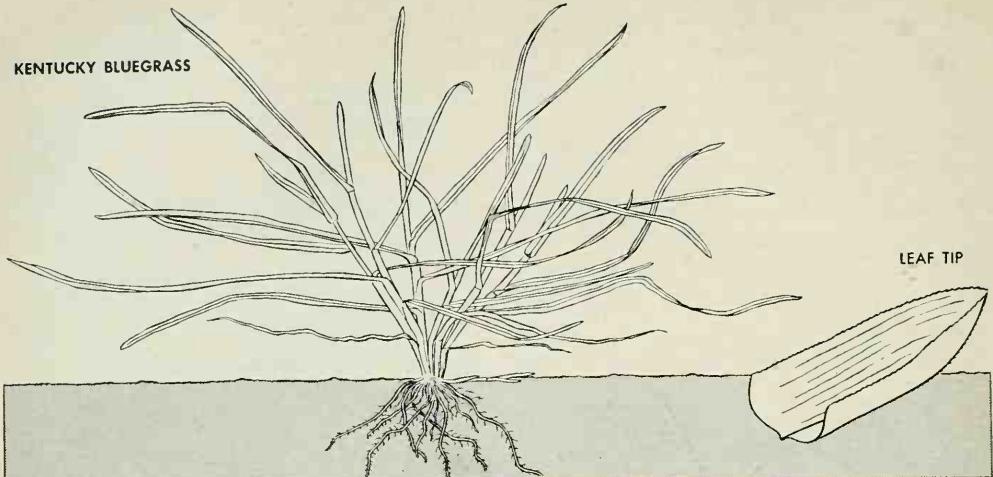


FIG. 44

Shown above is an exaggerated drawing of Kentucky bluegrass with its compact roots and boat-like tips

Kinds of Grasses

Having suggested how to establish a new lawn, rebuild an old one and care for both kinds, it may seem like putting the horse behind the cart to discuss the various species of grasses which you can use in your lawn. But this arrangement actually seems to avoid confusion. Here, then, we present an overall view of the different kinds of grasses that are at your disposal.

Most of the desirable grasses will thrive practically anywhere in the Northern Hemisphere, so the California gardener has about the same grass seeds from which to choose as one who lives in Maine. Even as far north as Alaska and Canada, excellent lawns are grown from the same kind of seed used successfully over most of the United States and even in the higher elevations of Mexico.

It is true, however, that most grasses grow more successfully in cool, moist climates rather than in locations where the weather is predominantly hot and dry. Just as long as the nights are cool enough to keep the soil temperatures from getting too high, daytime temperatures over 100 deg. Fahrenheit will not harm most grasses. There will, of course, have to be an adequate supply of moisture for the grass roots.

The average lawn springs up from a mixture, or blend, of various kinds of grasses. Although the same species of grass seeds are used in these blends throughout the country, the ratio of one kind of seed to another varies according to climatic conditions. The blend of grass you choose will also depend on (1) whether you are using it for an open sunny or lightly shaded lawn, (2) whether you are establishing a lawn in a densely shaded area which receives little or no direct sunlight or (3) whether

you are growing a pure bent-grass lawn like putting greens.

Most seed mixtures used by the average home gardener are commercially prepared by seed stores. The advisability of purchasing these mixtures depends on the reliability of your seed dealer. Commercial seed mixtures often contain grass seeds that have no chance of surviving in certain types of soils and climatic conditions. It is also these species that are largely responsible for the high cost of seed mixtures. Take for example the species of grass known as *Poa trivialis*. This is an imported, expensive seed which makes up 20 to 50 percent of most mixtures prescribed for shade or semi-shade. *Poa trivialis* has little chance of surviving in climates where the summers are very hot, so a St. Louis, Mo., gardener would be throwing away money by purchasing a mixture containing this species. Many mixtures also contain various species of fescue grasses, which are also relatively expensive. The fescues do form beautiful lawns in the northern and northeastern parts of the country, but do not establish easily in southern climates. Therefore to sow fescues in the South is a waste of money as well as time. The best policy is to buy the various kinds of seed separately and mix them to meet specific soil and climatic conditions under which they are to be used.

We are not advising you to distrust seed dealers, but it's a good idea to be on your guard when purchasing grass seed. If you are familiar with the grasses and their growing habits, you can save yourself unnecessary work, time and money. Never buy a cheap seed mixture with the idea of saving money. You are letting yourself in for extra work, and in the long run a poor

AVERAGE GROWTH PATTERN OF KENTUCKY BLUEGRASS

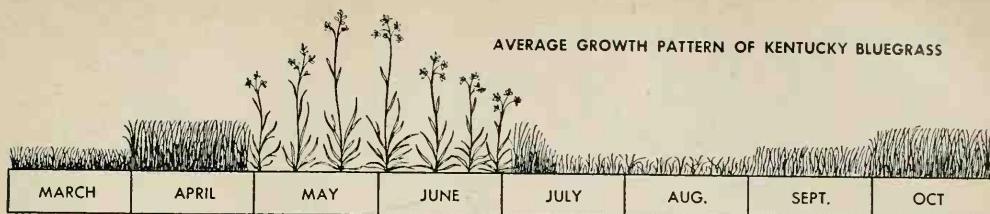


FIG. 45

The diagram shown here takes you through the entire growing season of Kentucky bluegrass. Starting as small, dark-green leaves in March, the grass attains more vigorous growth in April. During May and June comes the blossoming stage of this grass. When the weather gets extremely hot and dry in July and August, the grass plays dead. The cool September and October days bring the grass back to vigorous growth and green beauty.

lawn is more expensive to improve than a good one is to maintain.

Bluegrass: There are many varieties of bluegrass, the most common being Kentucky, Canadian and the annual varieties. Kentucky bluegrass (*Poa pratensis*) is generally considered the best variety for lawns upon home grounds because of its ideal green color, fine texture and deep roots which spread underground to produce a compact turf. Moreover, it is easy to care for and the seed is inexpensive and can be bought at any seed store.

Varying from plant to plant, Kentucky bluegrass is hard to describe precisely (see Fig. 44). It comes in a number of species, subspecies and varieties. The leaves come in many sizes and shapes. Some of the strains have the widest grass leaves in a lawn and others the narrowest. It is not really blue in color and only at certain times of the year does it even have a bluish cast. The easiest way to recognize Kentucky bluegrass is by the bunched way in which it grows. If a small sample is pulled up from the lawn and gently pulled apart, the leaves and stems do not come apart singly but are in tight little bunches.

The growth of Kentucky bluegrass follows a definite pattern (see Fig. 45). It begins to grow in the spring, showing up as dark-green leaves. During the first week of growth bluegrass stays close to the ground. Then, as the season advances, there is a sudden burst of activity and the grass shoots up as high as 6 in. or more. It starts to flower in early May and produces a branched tassel-like top. The hot weather of June and July makes this grass play dead. It does not really die if it is in good health, but merely lies dormant or semi-dormant through the scorching heat. Unless the summer is unusually cool and moist or the lawn is well watered, it remains through the summer as a dry, wiry turf

| SYMBOLS |
|---|
| BEGINNING OF LEAF GROWTH |
| MORE VIGOROUS LEAF GROWTH |
| BLOSSOMING, HEIGHT INDICATING VIGOR OF GROWTH |
| DORMANT STAGE—WIRY, DRY TURF |

with the leaves more or less brown and singed-looking until the cool nights of fall arrive. Then it starts to grow again; slowly if the autumn is dry, rapidly if moist. By the first frost it is again a carpet of green and remains so until the ground freezes.

Kentucky bluegrass has some disadvantages which should also be mentioned. Chief among these is its slowness to germinate and establish a lawn. This is usually corrected by mixing a faster-growing grass, such as redtop, to provide the green growth until the bluegrass can come up. Kentucky bluegrass will also not grow well in shade or upon infertile, dry or poorly drained soils. Moreover, it does not produce a turf so compact as to smother dandelions and other competing weeds. Patience is the key to a beautiful bluegrass lawn, for it takes a few years for it to build up and attain the vigor and density to crowd out weeds.

If you decide to grow a Kentucky bluegrass lawn, the following facts may be helpful. It does best on a sweet loam soil, in full sunlight and in medium temperatures. In seeding a new lawn, about 6 lbs. of seed will be needed for every 1000 sq. ft. of area. The grass should be allowed to reach a height of 2½ to 3 in. before it is cut for the first time, and it is best to remove the clippings from the lawn. Do not allow a bluegrass lawn to go into the winter with more than 1½ to 2 in. of top growth. Fertilizer should be used once in the spring and again in the fall. A bluegrass lawn is not to be sprinkled, but soaked to a depth of at least 6 in. during summer months. During the months of June, July and August, maintain the turf at a height of 3 in.

The only variety of bluegrass which is really blue is Canada bluegrass (*Poa compressa*). Compared to Kentucky bluegrass, it is a bluer green at all times of the year, somewhat smaller, much more slender,

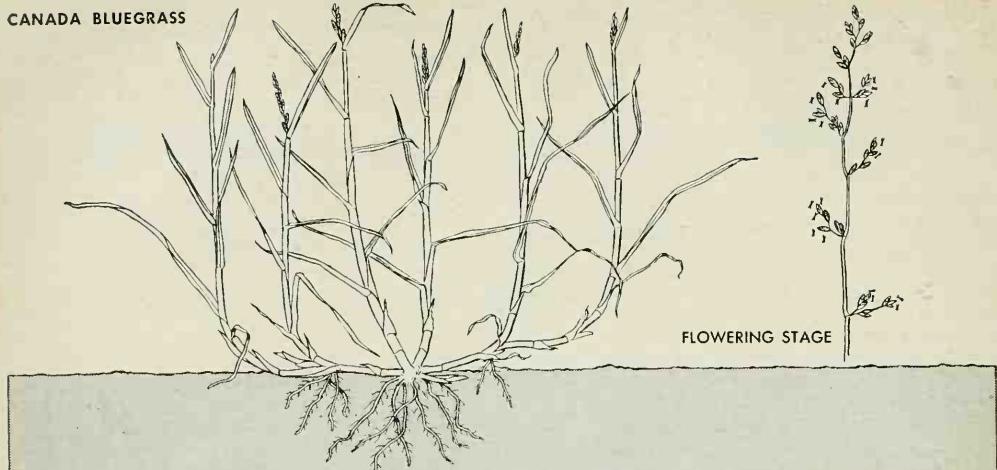


FIG. 46

The Canada bluegrass differs from the Kentucky variety in that it has longer runners and flowering stems

more stemmy and less leafy (see Fig. 46). At first glance the Canada variety resembles Kentucky bluegrass when pulled up from the lawn. But a closer look will reveal longer runners and flowering stems which arise singly rather than in little bunches.

A very noticeable characteristic of Canada bluegrass is its flattened stem early in the spring. At this time of the year its stem and leaf bases are often shaded with dark red, and the combination of the blue-green and dark red in the turf makes this grass species easy to recognize. It flowers a little later than the Kentucky variety and does not dry up as much during the hot summer days. The flowering tassel is smaller and proportionately narrower. It will grow on poor dry soils where Kentucky bluegrass will not succeed. Canada bluegrass produces sparse, ragged, gray-blue-green turf.

Annual bluegrass (*Poa annua*) is another species of bluegrass. It produces a lower turf than Kentucky bluegrass, appears much earlier and is an annual rather than a perennial. In many geographical locations, it is the first grass to become green, sometimes showing as early as the first week in March. It is often considered a weed grass because it will thrive in soil that is too wet or too compact to support a healthy growth of the more desirable grasses. Where this grass appears, the area should be liberally fertilized and desirable seed planted so good grass can replace the dead annual bluegrass after seeding cycle is completed.

Beginning as a chunky little rosette, the leaves of annual bluegrass are much like those of Kentucky bluegrass, although shorter, lighter-colored and much more succulent (see Fig. 47). Rare in sunny lawns, the annual bluegrass does best in

shady areas and is usually found along a walk or next to a building. The plant is very low, seldom reaching a height of 3 or 4 in. And because of the smallness of its flowering tassel, it often goes unnoticed in a lawn of mixed grasses.

The annual bluegrass reaches the height of its flowering season in late April and from then until the end of May it becomes yellower and more dried-up. At the onset of hot weather it disappears completely. By this time its seeds have been sown, and they remain dormant through summer and autumn and germinate during the winter. Its seed is not produced commercially because of the difficulty in harvesting such short growth.

Redtop (*Agrostis alba*): The desirability of redtop is doubtful except as a "nurse" grass for bluegrass lawns. It provides a "quick cover" of green growth to give an attractive appearance to the lawn while the bluegrass is taking its time getting established. However, redtop is the type of perennial which becomes coarser and more vigorous each year, soon becoming very unsightly.

When sown, redtop germinates very rapidly, usually within a week. In the first season of growth it provides a desirable, fine-leaved, light-green turf. In the second season it assumes the "Mr. Hyde" of its "Jekyll-and-Hyde" personality, becoming an entirely different-looking plant with coarse leaves and long sprawling stems which are impossible to cut with a lawn mower. Its light-green color makes redtop look even more shaggy when it grows with bluegrass.

Instead of rising up straight like bluegrass leaves, redtop sprawls out at an unmannerly angle (Fig. 48), and displays its

ANNUAL BLUEGRASS

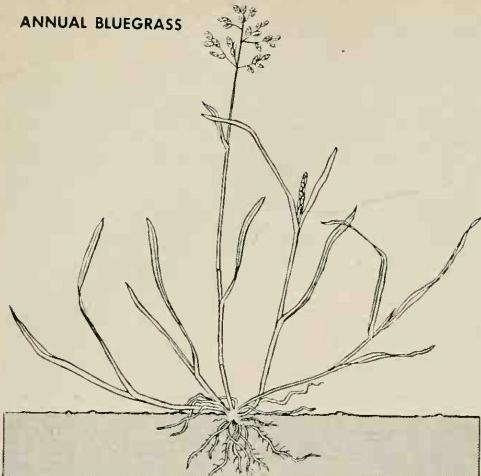


FIG. 47

The exaggerated drawing above shows annual bluegrass at its flowering height, from April through May

yellow-green blades conspicuously. This species of grass is closely related to the creeping bents, and like them, it has the ability to creep along the surface of the ground and occasionally to root at the joints. But there the resemblance stops. Because of its wiriness, reedtop grows fairly well in shady areas and on sour soil. It can stand to be closely mowed.

Rye grass (*Lolium perenne* and *Lolium multiflorum*): The two main species of rye grass, perenne and multiflorum, are essentially similar except that the former is a perennial and the latter annual. Both resemble Kentucky bluegrass in that they grow in small bunches, but in other aspects they differ widely.

The leaves of rye grass are strikingly glossy when seen in sunlight, and the joints

REEDTOP

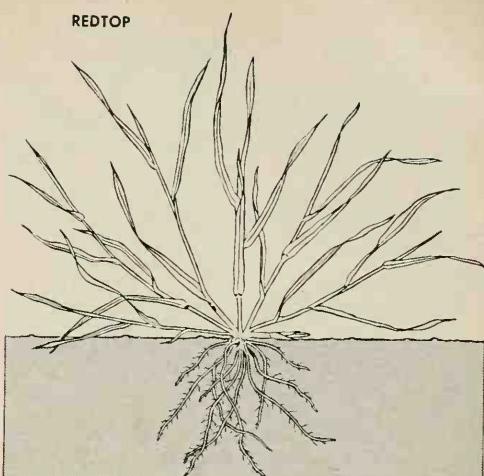


FIG. 48

The fast-growing reedtop is satisfactory as a "nurse" grass but is too coarse and wiry for a good lawn

of their stems are swollen so that they are one-third larger than the other parts of the stem. Other visible characteristics of rye grass are its lack of underground runners, its spear-tipped leaves and its narrow and spike-like tassels with individual spikelets pressed closely against two sides of the stem (see Fig. 49).

Like reedtop, rye grass is useful only as a nurse grass, its chief value being rapid growth. It does not form a good turf by itself as it lasts only until more persistent grasses choke it out. Moreover, the wiry leaves and silica-containing leaves of the rye grass make it difficult to mow. And although it looks presentable at first, hot weather soon causes rye-grass leaves to curl up and become brown. Rye grass remains in this state until cool weather re-

PERENNIAL RYE GRASS

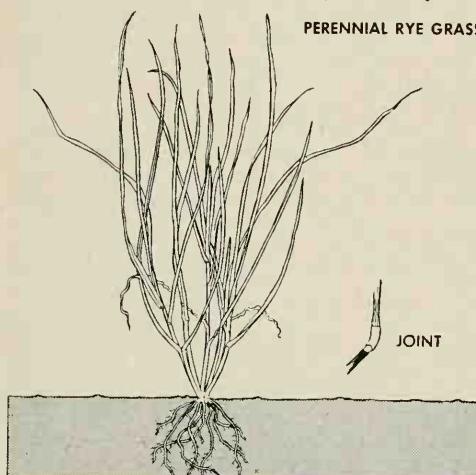


FIG. 49

Rye grass is also useful only as a "nurse" grass, and it is soon choked out by the more persistent grasses

FESCUE

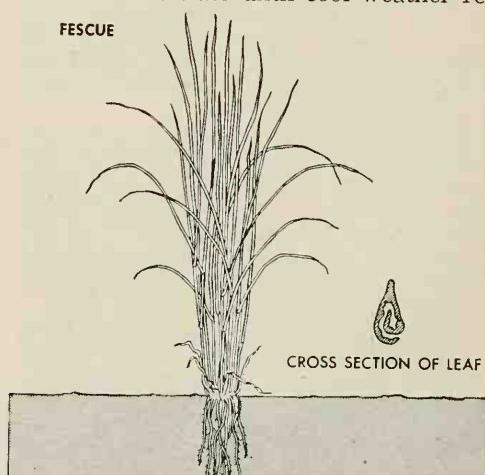


FIG. 50

The fine-leaved chewings fescue is good for shady lawns because of low light and moisture requirements

CREEPING-BENT STOLON

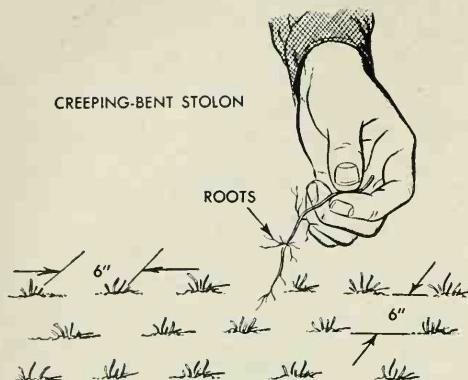


FIG. 51

Planting stolons individually is a big job, but one which produces excellent bent-grass lawns. Plant the stolons so they will be 6 in. apart on all sides

turns in late September and allows it to become a glossy, dark-green turf once again.

Chewings fescue (*Festuca rubra var.*): Usually included in grass mixtures for shady lawns is chewings fescue, a fine-leaved, bluish-green grass. Its value lies in its low demands for plant food, moisture and light. It forms a thick, close turf of good color and texture under adverse conditions.

In most climates, this is the best kind of grass to plant under trees where the soil is dry and sunlight does not reach. Chewings fescue also does well on sandy soils where most grasses will not thrive. Because it differs from bluegrass in both color and habits of growth, these two grasses cannot be grown together. Fescue grows in definite clumps and in dry weather becomes so wiry that it becomes difficult to cut. Hot, humid weather does not agree with chewings fescue, so it will not survive where the summer heat becomes extreme. Although it is common in Europe and some parts of Asia, chewings fescue seed is usually imported to the United States, which makes it relatively expensive.

Bent grasses: In a class by themselves are the bent grasses, whose characteristics and growing habits are so different from those of other grasses that they have to be discussed separately. Whenever there are exceptions to general rules of growing and maintaining a lawn, these usually apply to bent grasses.

As far as beauty in a turf is concerned, a bent-grass lawn is hard to beat. But because of its many disadvantages, this type of grass is not suited to the average home lawn. In the first place, the bent-grass seed costs more than the average home owner cares to pay. Bent grasses also require more than ordinary care; this includes special preparation of the soil, almost daily watering, frequent close



FIG. 52

If you are establishing a bent-grass lawn by sowing stolons, don't forget to roll the area, as above, so that the stolons are firmly pressed into the soil

mowing, top-dressing and fertilizer. Moreover, these grasses will not stand heavy wear or adverse climatic conditions and are subject to various diseases. All in all, the management and care of a bent lawn requires more time than the average home owner can afford to spend.

Despite all the shortcomings of the bent grasses, the beautiful lawn they produce is reward enough for some patient gardeners who do not have to keep a vigilant eye on the clock. For the sake of anyone who cares to try a hand at establishing a bent-grass lawn, the following discussion is included.

Among the many bent grasses on the market are the Astoria bent, black bent, brown bent, colonial bent, Columbia bent, creeping bent, English bent, New Zealand bent, metropolitan bent, Virginia bent and Washington bent. For most purposes, all of these can be put into two general categories — the colonial bent (*Agrostis tenuis*) and the Washington bent (*Agrostis palustris*). These two types of bent grasses are similar in many ways, but there are some distinguishing characteristics.

The colonial bent is not as creeping as the Washington, is somewhat deeper-rooted and its leaves are wider and a lighter green. The Washington strains produce longer runners and are therefore better known as creeping bents. Their plants are shallow rooted and their leaves soft, narrow and of a characteristic dark-green color. Because their leaves are narrow they produce a finer and more attractive turf than do the colonial bents. However, because of their shallow-rootedness, the Washington bents are not as heat-resistant as the colonial strains and therefore need more care.

Colonial bent is one of the best turf-producing grasses. When it is combined with a bluegrass mixture, a lasting and beautiful turf is produced. Although it is resistant to

poor soils and drought, the colonial bent grass is best suited to an average fertile, well-drained soil. Maintaining a good green color throughout the season, this species of grass also does well in keeping out encroaching weeds. If you choose to establish a bent-grass lawn, it is wise to consider the time involved to maintain that lawn as well as the quality of turf produced.

If you are starting a bent-grass lawn from seed, the same procedure is followed as for a bluegrass lawn, except that 3 pounds of bent-grass seed are enough per 1000 sq. ft. of area. A bent-grass lawn can also be started from plugs or stolons. (Plugs are pieces of turf that result from the separation of strips of sod, while stolons are runners that have been chopped up into short lengths.) Whichever method is used, planting should be done in the fall, about the middle of September.

You can plant the stolons individually or sow them as seeds are sown. The first method is a more laborious one, but the results will be more satisfactory. Plant the stolons about 6 in. apart, as shown in Fig. 51. If you sow the stolons, press them into the soil by rolling (Fig. 52), covering them with about $\frac{1}{4}$ in. of good topsoil and rolling the area again. After the stolons are planted, the top of the soil must be kept moist until the green growth appears.

Plugging takes more time than planting stolons, but it produces a very fine lawn. The soil should first be prepared as for seeding; then the plugs can be planted, along with some stolons, 6 in. deep and 6 in. apart. You will need the aid of a trowel to do this. The tool shown in Fig. 54 is ideal for transplanting bent-grass plugs. It is made from an old tire pump. The plugs do not have to be large—a piece of turf about the thickness of two fingers is adequate. The soil should be watered after plugging and not be allowed to dry out during a few months thereafter. During the fall and winter, the plugs look as if they are dead, but if they have been planted to the proper depth and well watered, they will always survive. Growth from the plugs begins early the preceding spring, and they develop very quickly after that.

By early summer the entire lawn will be covered with a beautiful turf if it has been properly cared for.

While the bent-grass lawn is being established, the soil should be kept completely weed-free until the turf is formed. This means hand-weeding at least once and perhaps twice a week, because the patches of bare ground between the plants are ideal for weed growth. The knee rest shown in Fig. 55 will come in handy for this job. Once a dense turf has been formed, you will have little trouble with weeds because bent

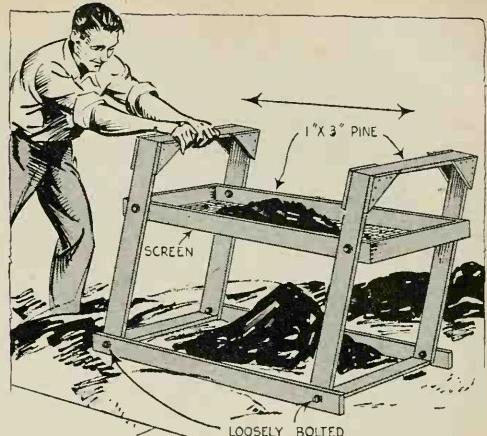


FIG. 53

A rocking screen sieve like the one above will prepare soil for your bent-grass lawn in short order. Use scrap lumber to assemble the framework. The legs are held in alignment at their top ends by means of corner braces. The screen is pivoted loosely to the legs and the latter are pivoted to the base frame

FIG. 54

To make this tool, remove the base from the pump and sharpen the lower end of the barrel. Replace the leather on the plunger with a wooden washer or disk, and drill the plunger rod near the handle end for a couple of cotter keys, one for a depth gauge and the other to keep the plunger from coming out

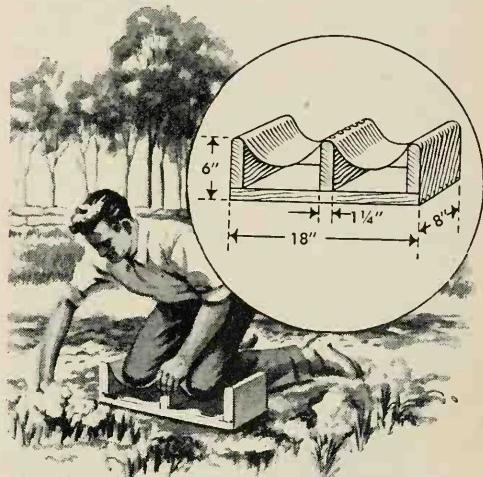
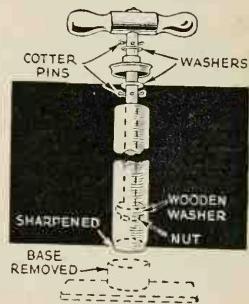


FIG. 55

You will have to do most of the weeding on a bent-grass lawn by hand, so the knee rest below will come in handy. The base is made large enough so that it won't sink into the ground. Sufficient slack is left in the canvas cover to provide comfortable knee rests



FIG. 56

A bent-grass lawn tends to dry out fast when it is trying to get established, so a topdressing of weed-free topsoil or peat moss should be spread over the area, as above, to conserve and hold in the moisture

grasses can easily crowd out the weeds. However, if weeds do cause any trouble, avoid chemical weed eradicators as the results may be disastrous. One exception to this rule is calcium chlorate. This compound can be used at the rate of 2 oz. to 1 gal. of water to kill chickweed. This treatment is most successful in dry weather in late fall.

Other cultural practices will keep you busy, too. First of all there is watering. Bent grasses require more water than any other kind of grass. This is because they are very shallow-rooted, and drying of the surface topsoil would cause the plants to wither and die. During the summer months watering would be required every day or at least once every other day. Do not water from an open hose; instead use a sprinkler. It is important that the turf be watered early in the day so that the surface will be dry by evening. A wet turf at night is more susceptible to fungus disease than a dry one.

Because the bent-grass stolons merely run parallel to and do not penetrate into the soil, the sod can very easily dry out. To prevent this, it is necessary to provide some sort of cover for the sod. Weed-free topsoil is the best top-dressing for this purpose. This dressing should be applied about four times a year—once in the spring to a depth of $\frac{1}{2}$ in., two lighter applications, $\frac{1}{4}$ in. deep, during the summer and one more heavy application in the fall. The lawn should first be mowed; then the topsoil can be worked into the soil with a broom or fan-rake. If small spots appear that need top-dressing at any time during the year,

this should be taken care of immediately. If topsoil is not available, a mixture of 3 parts peat moss to 1 part sand is a good substitute (see Fig. 56). The outstanding beauty of good bent-grass lawns is largely due to frequent top-dressings, and poor lawns therefore can be blamed on insufficient top-dressing.

Besides the top-dressing, bent grasses need an application of a complete fertilizer twice a year. Apply a fertilizer with about a 10-5-3 analysis at the rate of 20 lbs. per 1000 sq. ft. late in September and again early in March. Whatever kind of fertilizer you use, it should have about twice as much nitrogen as phosphorus and a smaller amount of potash. About two pounds of nitrogen are needed by every 1000 sq. ft. of bent-grass lawn.

There are two fungus diseases that often harm bent grasses. These are known as "brown patch" and "dollar spot," both of which appear during the summer when the humidity is especially high. Bluish-gray spots show up on the grass leaves, after which the grass becomes brown and dies in a couple of days. No way has yet been found to prevent these diseases, but they can be effectively controlled by using arsenic-mercuric compounds. One which has worked well on many lawns is sold under the trade name of "Calo-Clor," and the directions for using it are supplied with the container.

A bent-grass lawn also demands special attention in mowing. It has to be kept at a $1\frac{1}{2}$ to $1\frac{3}{4}$ -in. height throughout the growing season. This may call for mowing once,

twice or even three times a week, depending on growing conditions. If bent grasses are allowed to reach a height of 3 in. or more, they will not survive. Therefore, if you want a grass that can be forgotten while you are on vacation, bents should not be considered.

New grasses: Just as there are experiments going on to improve and produce hybrid forms of vegetables and flowers, attempts are also being made to obtain better grasses. These experiments include efforts to determine the best growing conditions for the common grasses as well as the actual "discovery of new grasses."

Zoysia japonica is one of these miracle grasses. This amazing grass can successfully survive in temperatures from 40 deg. up to 110 deg. Fahrenheit and with no artificial watering during drought.

Zoysia, which comes from the Orient, spreads from small plugs inserted in old weedy turfs in the spring and forms a solid, unbroken lawn by fall. Furthermore, it is not damaged by Japanese beetles, and some repellent factor in its roots can actually drive out these pests. It also has an inherent re-

sistance to common lawn diseases. And the hot, muggy weather which drives out bent grasses neither bothers nor harms *Zoysia*. Because it starts growth so early in the spring and quits so early in the fall, *Zoysia* does not make up a perfect lawn when grown alone. It is especially poor when allowed to grow too high, so it has to be kept at about a 1/2-in. height. The poor growing habits of *Zoysia* can be corrected by combining it with other new grasses.

There is an improved variety of bluegrass which goes by the mysterious name of B-27 bluegrass. Unlike the common forms of bluegrass, this particular species does not go dormant in midsummer when the temperature soars above 80 deg. Fahrenheit. The common bluegrass would be choked out when grown among *Zoysia japonica*, but B-27 can hold its own. This is because it starts growing early in the spring and remains active throughout the summer until hard freezing weather arrives. It is a good grass to use because it fills in lawn gaps which would otherwise be bare.

U-3 Bermuda sounds like a secret weapon, but it is only a new variety of Bermuda

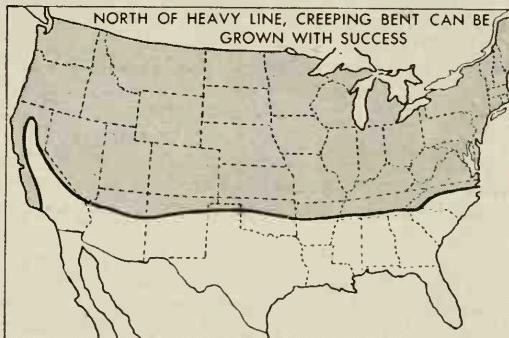
grass. The common Bermuda grass winter-kills anywhere north of the Mason-Dixon line, and is so coarse that most home owners will not use it for lawns. This is not so with U-3. It is a hardy plant which will survive sub-zero weather. Growing from a creeping rootstock, U-3 has much finer blades than ordinary Bermuda grasses and even finer than most bents. It has a good, rich green color. Best of all, it is not particularly sensitive to disease except for a minor leaf spot. The only "catch" where U-3 is concerned is that it cannot be planted everywhere because of its aggressiveness. If used near flower beds or shrubbery borders, it would probably drive out these other plants. The U-3 Bermuda grass is best where the lawn is the only ornamental plant growth other than trees or where it

can be pent up by concrete curbs and walks. This grass has to be clipped close, often as short as 1/2 in. The resulting lawn is an impressively uniform and thick green carpet. It has a longer growing season than *Zoysia*, but shorter than that of bluegrass. Because of its vigorous nature, U-3 needs but a few runners set out, which will

cover an acre in almost no time.

Two new varieties of the fescue grasses—Penn State chewings fescue and Alta fescue—are also among the new grasses. The Penn State fescue looks nothing like a fescue. It grows more upright and does not have the soft, lax habit of growth nor the gray-blue color of chewings fescue. The only similarity is the creeping rootstock. This forms a close dense turf that can also compete successfully with *Zoysia*. It also survives in drought, heat, sandy soil and shade.

The Alta fescue is a big, heavy, coarse grass that is hardly the ideal grass for a good lawn. However, its heavy, healthy roots are able to grow even in pure sand and gravel. It needs a special kind of fertilizer which will not be washed away in the sand and gravel. The uraform compounds are such a fertilizer, becoming available so slowly that even three months after application the plants are still getting a slow steady feed of nitrogen. Nitrogen is the most important of plant needs. It is the only plant-food element that is sold commercially.



Bent grass is strictly for moderately cool climates, approximately that temperate region shaded on the above map

How to select and plant trees

THE PICTURE created by your home grounds would be incomplete and monotonous without trees. A bare lawn, or even a lawn adorned with shrubbery and flowers, is lacking in the depth and texture which can be provided by trees—sources of beauty which have many useful purposes. First of all, trees relieve the flatness and bareness of the grounds. They also provide shade and serve as windbreaks. They provide a house with an interesting frame. Trees blend with the beauty of other plants, and create beauty of their own in form, color and shadow.

How to Plant a Tree

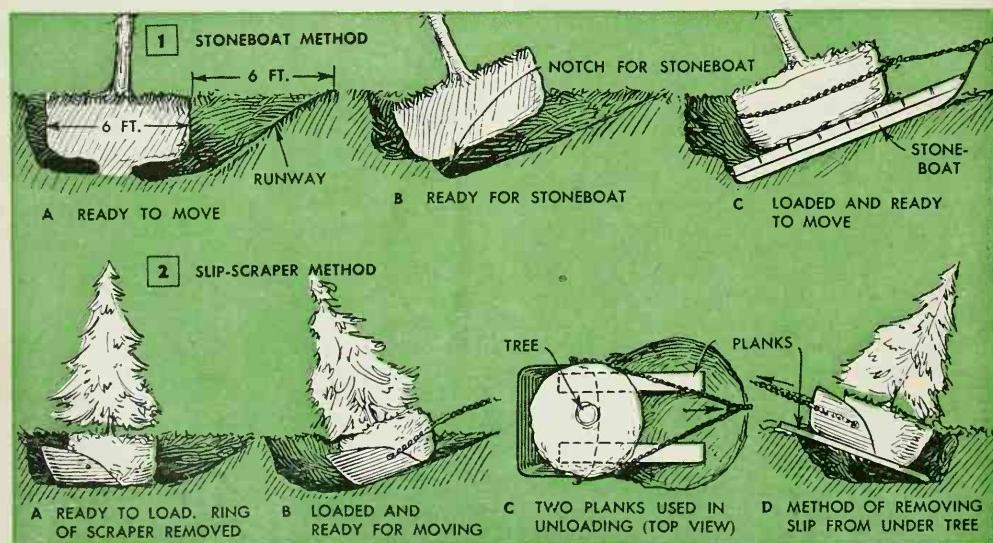
Unlike planting a lawn, a flower garden or a vegetable patch, where seeds, bulbs or sprouts would do the trick, planting trees means "transplanting" as far as the average home gardener is concerned. The propagation of trees from seeds, cuttings and grafts is a highly specialized operation which takes a good deal of time, and one that is best left to horticulturists, nurserymen and nature. Since transplanting is the quickest, simplest and most generally satisfactory method for the home gardener in placing trees on his grounds, the discussion on tree planting will revolve around this process.

Trees from the woods: Choose trees from the woods in summer, to best judge their health and beauty. Mulch the area around the tree with straw, leaves or burlap to prevent deep freezing when you come back during the late-fall period of dormancy. To determine the size of the earth ball you should dig up along with the roots, meas-

ure the trunk of the tree. For each inch of trunk diameter, the earth ball should be at least 4 ft. in diameter and 30 in. deep. If the tree is one of the evergreen types having a large taproot and is an exceptionally fine specimen, it will be best to go even deeper to include as much of the root system as possible in the earth ball. Surface-rooting trees, such as maples, require only a shallow ball.

In digging the soil away from the ball be careful not to cut the main lateral roots. Dig these up with a spading fork, wrap them in burlap and tie them into the earth ball. The root wrappings must be kept moist until the earth ball is cut out completely, wrapped in burlap or canvas bound ready for moving. When the ball has been prepared, the tree should be removed to its new location and set without delay. Figs. 1 and 2 show two acceptable methods of moving small and medium-sized trees. Care must be taken during the operation to prevent breaking the ball of earth. It should be removed and reset intact for best results. The excavation to receive the earth ball should be made beforehand and should be larger than the ball. The top of the ball of earth is set slightly below grade level.

Buying trees at the nursery: The wisest course for the average gardener is to buy nursery-grown trees. Such specimens have been purposely developed to give their roots strength for transplanting. Nurseries also grow only those varieties of trees which will thrive most successfully in that geographical area. Moreover, by obtaining your trees from a reputable nursery, you



can also get the proper instructions for their planting and care.

The size of the tree you buy will depend on the effect you wish to create and the amount of money you can spend. Trees which are from 5 to 8 ft. high can be bought very cheaply, while those ranging from 8 to 15 ft. cost a bit more. The cost also increases if the tree is balled and burlapped (referred to as B & B by nurseries). A deciduous tree up to 12 ft. can be moved without soil on the roots, although the B & B method, which is used on all evergreens, is now being practiced with many deciduous trees to reduce possible losses from transplanting.

Unless your budget for trees is a generous one, you need not spend a lot of money purchasing the larger sizes of trees to plant. If you want immediate results, why not plant a quick-growing tree, such as the poplar, among the slower-growing trees which will become your permanent plantings? When the permanent trees have reached a good height after a few years, you can dig out the temporary trees. One word of caution is necessary here. There is no such thing as a "bargain" in tree-buying. Buy stock of which you are certain or which is fully guaranteed even if you have to pay more.

You should be especially particular when you are buying evergreens. Get balled and burlapped stock, like those shown on this page, from a reputable nurseryman and follow his instructions to the letter. Balled evergreens should be at least three years old. The five-year specimens of most varieties cost more, but these have had the benefit of two more years of training in the nursery. Perhaps the price of evergreen trees may seem high to you. But it must be realized that the vigorous conifers cannot be produced cheaply. Propagation is by seeds, cuttings and grafts. The young plants are set in rows close together and so cultivated. Before crowding begins, they are lifted, the roots are pruned back and then the trees are transplanted farther apart. This process may be repeated four or five times. In catalogues, the symbol "X" means that the tree has been pruned

and transplanted. Thus the description "XXXX" means that the roots have been pruned four times and the tree transplanted an equal number of times. Such a tree will have a compact root system and top growth; it will be well shaped and bushy, in contrast to the cheaper tall, sparse specimens that were left to grow at random from their seedling stage. If price is a consideration, buy the small X'd varieties rather than the tall inferior ones.

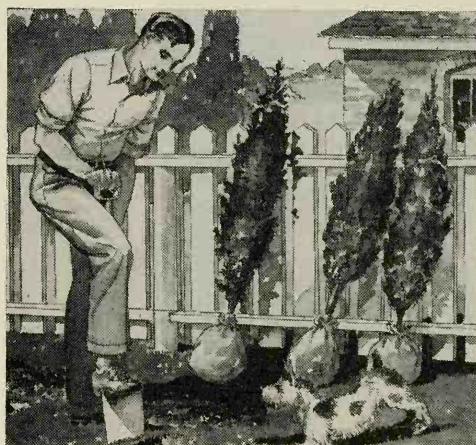
Use the Latin names of the trees in ordering them from the nursery. This is advised because there are so many varieties of even one species. Take, for instance, the ash tree. There are the white ash, the blue ash, the flowering ash and many more. If you can give the exact Latin name of the variety of tree you want, there is little chance that the nursery will substitute another variety without your permission.

As can be expected, any plant suffers a shock when it is moved from one place to another. However, if trees are planted carefully and properly, they will adapt themselves to the new conditions within reasonable time. The practices

which should be used in tree-planting will follow. From time to time, different rules will apply to deciduous trees as compared to the evergreens. The growing patterns of these two classification of trees differ in that the deciduous varieties shed their leaves during the fall and grow new ones the following spring. Evergreens, on the other hand, retain their foliage all the year around.

When to plant: The safest time to plant a tree is in early spring. Plantings may be made in early fall if the roots will have time to adjust themselves before hard frost sets in. Generally, deciduous trees can be transplanted any time from September to March. They are most easily handled and less likely to be damaged when dormant. The dormant stage is that period before the trees have grown new leaves or right after shedding old ones.

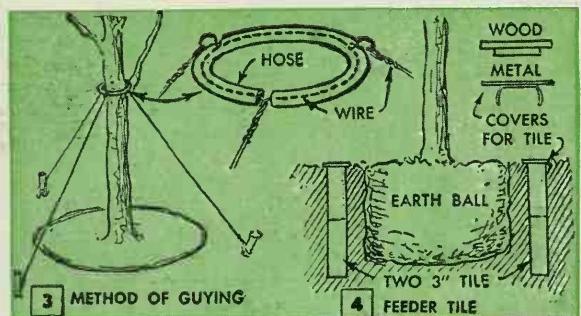
Evergreen trees are usually more difficult to re-establish after transplanting than deciduous trees. It is best to perform this task during the period that the evergreens



To transplant evergreen trees, obtain balled and burlapped stock, as shown above. The hole should be 6 to 12 in. broader on all sides than the balled roots



After the tree is staked to hold it upright, mulch the soil around the tree to protect the roots from drought and freezing



are in active growth—in early spring or better still, in most localities, in August or September. If they are moved without the ball of their original soil, the most satisfactory results are obtained by transplanting them during September or early May. If, however, the evergreens are moved with considerable balls of soil attached to the roots, they may be transplanted even during the winter.

Growing conditions: The kind of soil, the condition of drainage and the amount of sunlight available for the transplanted tree should be similar to the conditions to which that tree is accustomed. If you buy the tree

from a nursery, you should find out something about its growing habits from the nurseryman. Transplanting a tree from the woods presents a little more difficult problem, but one which you can solve by examining its growing conditions in the woods and by reading up on the particular species of tree. The more common species of trees and their characteristics are listed later on in this section.

Some sort of drainage system will be needed where the natural water level in wet weather is within 2 ft. of the surface of the ground. Otherwise, the lower roots of the trees may be killed, particularly if the soil is heavy or of a clayey nature. Even if there is good surface soil as far down as 12 or 15 in., a layer of hard gravel or other material may check the tree's growth.

Preparing the ground: The best way to prepare the ground for planting trees is to trench it to a depth of 2 or 3 ft. But where the space is limited and trenching cannot be done, large holes—deeper and wider than the roots require—should be dug. A hole 3 to 4 ft. in diameter is about right for small trees if the natural soil is of good quality; wider holes are necessary where the soil is poor. Larger trees will need holes measuring 6, 8 or even 10 ft. across. The depth of the hole should be about 3 ft. for large trees and 2 to 2½ ft. for smaller ones. In all cases, the subsoil should be well broken up, especially if it is hard.

While digging, pile the good topsoil to one side, dig out the poorer subsoil and replace it with the best soil obtainable. If you use manure in the holes, keep it away from the roots as much as possible. Humus and plant foods, however, can be thoroughly mixed in the soil to a depth of about 12 in. when planting evergreens. Damp peat, not soaked, mixes better with the soil than when dry.

After the holes are dug, they have to be refilled within 9 in. of the surface before the tree can be transplanted. In filling the hole, the soil should be tressed or rammed down firmly. Where it is possible, water may be allowed to run into the holes to help firm the ground. Planting should not take place for two or three weeks after the holes have been partially filled or until such time as the soil has settled into position. If hurried planting is necessary, the lower soil

must be well rammed or trodden before trees are placed in position.

Planting: Of prime importance is to keep the roots of the trees moist, as drying would kill them. Should the trees arrive from the nursery before you have been able to dig the holes, you will have to "heel them in." This means digging a trench, placing the stock with the roots down, throwing dirt over the roots and watering. The trees can be kept in this manner for quite a while. However, if you can get around to planting the trees within a few days after they have arrived, you merely have to coat the roots with thick, soup-like mud, cover them with wet burlap and stand them in the shade. This latter process is called "puddling," or "mudding." Puddling can also be used to protect the roots from drying out if you are planting on a hot, windy day.

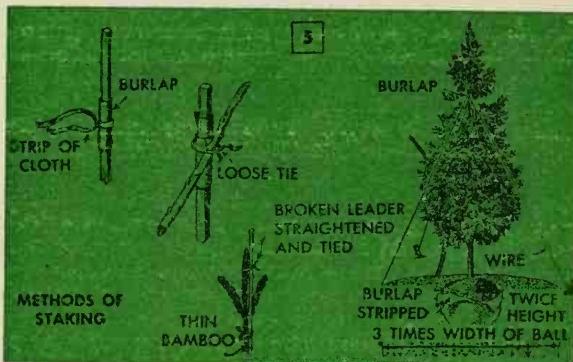
Just before planting, cut off any very large roots with a slanting cut to encourage new feeding roots to develop. Take care not to cut back too severely, especially keeping the shears or knife away from the small feeding roots. If the tree is hardwood, cut off the top and the ends of the branches about one fourth of their length to give the feeding roots less work the first season. But do not cut back an evergreen. Also avoid cutting off the tops of any trees. It is especially important that the leader, or top branch, is not destroyed. Where it is necessary to remove any branches, cut them off individually, preferably the lower ones. If the top of the tree is cut off, you begin with a tree that is maimed for life, and it is expecting too much that such a mutilated tree will ever be as sturdy as nature intended.

Whether deciduous or evergreen, the tree should be placed at the ground level it had originally, or not more than an inch lower. Above all, avoid deep planting. It is the cause of ill health and premature death for many trees. Keeping the roots near the surface of the ground is important. A good guide can be had by placing a rod across the hole at the natural level of the ground. One inch of soil placed above the rod, and therefore above the top roots, is usually sufficient.

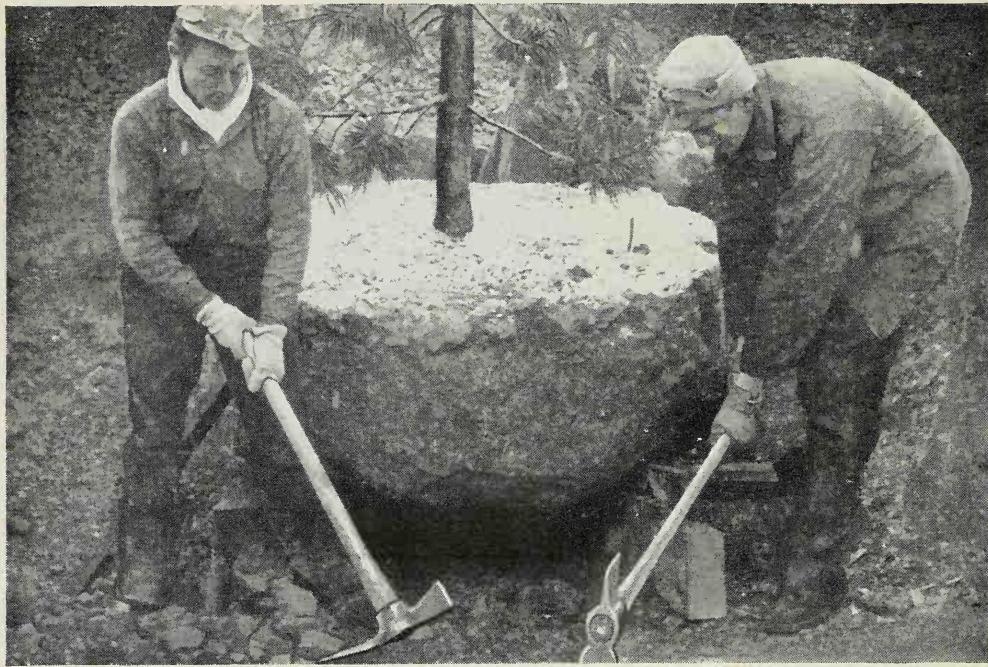
Tree planting is an operation which usually requires two men—one to hold the tree in position while the other fills in the soil



By placing a burlap shield around the staked tree as above, the tree is further protected against uprooting by the wind



and firms it about the roots. Since trees are usually transplanted when young and small, the job can, in most instances, be done by manpower alone. If, however, a well-grown tree—say one 30 or 40 ft. high—is being transferred from one place to another, machinery will be needed. In placing the tree in position, spread the roots out to their natural extent; then pack moist, well-pulverized soil around them. The entire hole should be filled with good topsoil if there is enough available. Otherwise, put the best soil around the roots by means of a rammer or by treading, making sure that



Hardened layers of soil will have to be well broken up so that the roots can penetrate deep into the earth

there are no air pockets left. A good watering at this point will help to settle the soil.

Staking: It is a good practice to stake any tree, especially if over 8 ft. high, after it has been transplanted. Not only does staking help the roots to get a good hold in the earth again, but it also keeps the tree in an upright position and prevents strong winds from knocking it over. Figs. 3 and 5 show the methods of staking, or guying. The stakes should be driven 4 or 5 ft. away from the tree trunk and equally distant from each other. Drive the stakes well into the ground, but be careful not to pierce the roots. Place a piece of rubber hose or a soft pad of folded cloth around the trunk for protection. Then run a wire or stout cord through the hose or around the pad and attach it, pulled taut to each stake top. The wire or cord should be given a couple of turns around the stake to prevent it from slipping, and the work should be completed with a secure tie. Several ties may be needed for a single tree. In staking a large tree, use a triangle of soft ropes secured to the trunk 5 or 6 ft. from the ground. Drive the stakes into the ground 3 ft. or so from the tree.

The wires should be examined occasionally to make sure that they are not cutting into the bark of the tree. This is quite important, for, if the hose pads wear through or break, the wires will quickly cut into the bark and leave a wound that will never heal smoothly, especially on large speci-

mens of certain varieties. The guy wires can be removed after the first growing season. A burlap shield can also be placed around a tree to protect it from being uprooted by the wind.

After-planting care: A good job of transplanting must also be followed by certain other chores in caring for the tree before it can become well established. The installation of feeder tile (Fig. 4), will be helpful in assuring the rapid recovery of a large tree after transplanting. Pour a small quantity of high-nitrogen fertilizer into each tile at regular intervals throughout the first growing season; this will provide an ample supply of plant food. Water should be poured into the tiles after the fertilizer has been applied.

Watering the ground thoroughly after the planting and staking is also of utmost importance. The ground should be kept moist, but not muddy, at all times during the first year after transplanting. Another must after tree-planting is to keep open ground about the base of the transplanted tree for a number of years, or until the tree attains vigorous growth. Only then should grass be allowed to grow close to the trunk.

In the early years after planting, assistance may be given during dry weather by applying a mulch of decayed manure and leaves to the ground above the roots. Should the leaves droop or begin to turn yellow, water should be provided. Tar paper can also be placed around a young tree

(Fig. 9) to help slow evaporation of moisture from the soil.

A good way to protect the trunks of young trees from damage is to make effective guards from lengths of garden hose which are wrapped around the trunks as shown in Fig. 6. The hose should be cut spirally by placing it in a wooden channel and then rotating it while sawing at a 45-deg. angle. Tension of the hose will hold it firmly around the trunk without damaging it. If there are frisky and hungry rabbits in your vicinity, you may also have to protect your young trees from these animals. A screen-wire guard (Fig. 7) is one way to keep rabbits from gnawing at the bark of trees. A sack of moth balls (Fig. 8) tied to one of the branches will ward off rabbits.

From this point on, most trees can manage with no more food and water than nature provides. But don't neglect your trees completely, as an occasional application of fertilizer and watering during a dry spell will help them along. You should become thoroughly acquainted with the need of your trees and the condition of the subsoil, so there is no danger of overfeeding and drowning the roots with too much water.

It is a waste of money to apply nitrogen at tree-planting time. Phosphorus and potash in bonemeal will combine with the soil with little loss by leaching, but nitrogen escapes. Moreover, the shortened root systems are inadequate to supply the moisture needs of the new growth that nitrogen forces. Four to six months can elapse before using nitrogen; if you have used leaf mold for humus, a year may well go by. Peat has almost no food value. Dry sheep manure can be used for evergreen trees. Apply 12 lbs. per 100 sq. ft. and work this in four to six months after planting. Other forms of vegetable or animal nitrogen may be used, but avoid chemicals. To keep the food supply constant, each year apply 15 lbs. of bonemeal, 2 lbs. of potash and 12 to 15 lbs. of sheep manure. Use half of the mixture in early spring and the remainder in August. Work in these materials and water thoroughly. Using plenty of humus not only keeps the soil open and light, but also enables it to retain the large quantities of moisture essential for dense foliage, health and vigor.

If you find that leaves are falling off the newly transplanted tree, there's no cause for real alarm. This is merely one of nature's ways of restoring balance between injured roots and branches. If, however, the leaves wither and remain on the branches, the recovery of the tree is most likely not progressing as it should. In this case, cut the branches back so that the strain on the roots will be relieved and there is balance again.



FIG. 6

One way of protecting the trunks of young trees is shown above. The guard consists of lengths of garden hose which are cut so they can be wrapped around the trees spirally

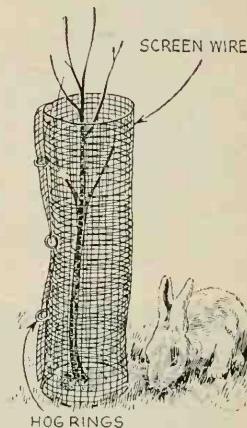


FIG. 7

If you have some extra screen wire available, you can put it to use by making a sleeve around a young tree to keep rabbits from gnawing the bark

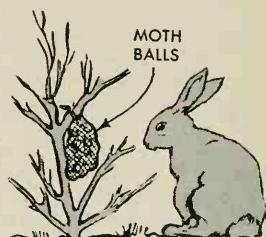


FIG. 8

Another way to protect young trees from the appetites of hungry rabbits is to tie a loose cloth sack of moth balls to the trunk a few inches above the ground, as shown at the right

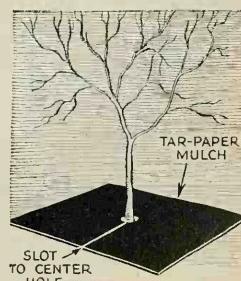


FIG. 9

When a small tree has just been transplanted, much of the success in getting it established depends on keeping plenty of moisture around the roots for the first few months. One way of doing this is by placing tar paper around the tree, as shown at right

Tree Selection

What trees should you plant on your grounds? That will depend on a number of factors. The climate of your region will limit, to some extent, your selection of trees. However, the majority of trees can adapt themselves to almost any condition. Such trees as the eucalyptus, magnolia, pepper and palm trees are, of course, best situated in southern climates; the eastern spruce and sugar maple on the other hand, do best in the cooler New England states. There are, however, many trees that will thrive in almost any situation.

The general purpose that your trees are to serve will also have to influence your choice. Here are some general rules about tree selection that might help you:

1. The important trees on a large lawn, or those that are next to a large building, should be tall and large-limbed and have generous foliage.

2. In a limited private area, small trees that can present a colorful floral display or a fine foliage background for other flowering plants would be ideal.

3. Go easy on the brightly colored trees; they should be used sparingly and only as special accents.

4. If you have room for only a single tree, don't get one with colored foliage. Choose, instead, a well-shaped tree with thick green foliage.

Keeping these rules in mind, you can go through the list of trees in this section to find those which meet the necessary requirements.

In selecting trees, you will also have to decide between relative permanence and immediate effect. Poplars, birches and willows, for instance, grow very fast. But they are short-lived. For slower-growing trees which live for hundreds of years, you may have oaks, maples and beeches, to name but a few. A compromise between the two extreme types of trees will suit most purposes. As has been suggested before, you can plant both types of trees and take out the short-lived species as soon as the permanent plantings reach a good height.

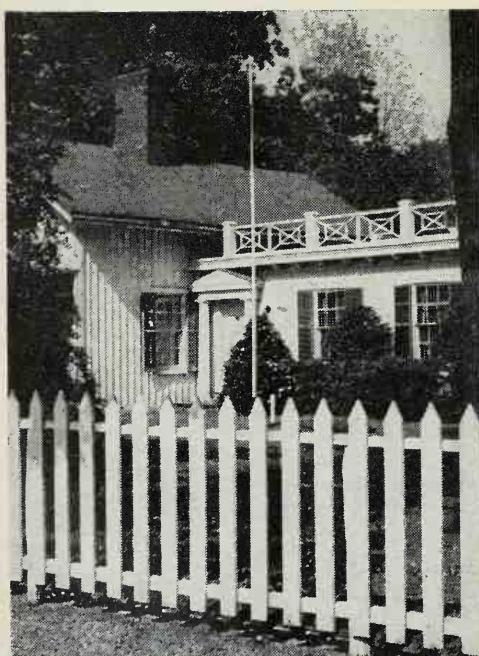
In all probability, you will want to mix deciduous trees and evergreens. Each has advantages that the other might lack. The two types of trees are listed separately, and your selections will depend on your needs and tastes. All the trees are listed alphabetically under the names by which they are most commonly known, followed by the Latin, or botanical names.

Deciduous Trees

Ailanthus (*same botanical name*): This tree, also called "Tree of Heaven," is a good choice if you want height and shade quickly. Growing rapidly, it reaches a height of from 6 to 10 ft. in a single season and has an average height of 50 ft. at maturity. The ailanthus spreads easily and blossoms with yellow-green flowers in the summer. It has small, sharp-pointed leaflets and the bark is brownish-gray. There are some drawbacks—the flowers and leaves of the male species have an unpleasant odor when crushed, and the wood is soft and weak. The former disadvantage can be overcome by planting the female species, which bears red fruit instead of flowers. Insects and diseases won't trouble this tree. It is also highly resistant to smoke and dust.

Alder (*Alnus*): Do you have a pond on your premises? If so, an alder is just the tree to plant beside it. The alder grows best in the cooler northern states in moist or even wet soil. The alder is related to the birches and has similar oval leaves with toothed edges. Catkins which develop into hard cones resembling small pine cones grow on the alder. Of the 20 or so varieties of the alder, the more common are the smooth alder, which grows to about 25 ft.; the black alder, growing to 70 ft., and the pyramidal japonica, which grows to 80 ft. and is the most beautiful species.

Ash (*Fraxinus*): The varieties of ash trees number over 50, but the white ash is the one most commonly grown for shade and ornament. The white ash is particularly good for lawn planting because of its



Combine deciduous and evergreen trees in your landscape. While the former change with the seasons, the latter give a uniform appearance throughout the year

long oval shape, beneath which grass grows well. Its foliage is dense and turns to a brilliant yellow and violet in the autumn. It has smooth, light-gray bark, small seven-pointed leaflets and clusters of small flowers. Other ashes are also good shade and ornament trees. The black ash, which has a broad head with open branching and few twigs, is a good shade-maker. The blue ash, a large tree, is commonly used in the Mississippi Valley and on the northern plains as wind shelter for the garden. A smaller variety is the flowering ash, which averages 25 ft. in height. It has fragrant blossoms and is well suited to garden use.

✓ **Aspen** (*Populus*): If there is room for a small grove of trees on your grounds, several aspens will prove attractive, contrasting their pearly-white bark against the green of the lawn. The light-green, heart-shaped leaves are attached to long thin stems which flutter and rustle the leaves in the slightest breeze. It is a hardy tree which will grow almost anywhere in this country.

✓ **Basswood** (*Tilia*): You can have shade, shelter and graceful form all in one where the basswood is planted. Forming a large pyramid with its large oval-shaped leaves, the basswood bears fragrant yellow flowers in spring. The basswood reaches a height of 80 ft. and is a good choice when your yard can support only one or two trees. It is also known as the American linden.

Bay tree (*Laurus nobilis*): Half-evergreen and a distant cousin of the magnolia, the bay tree is an ornamental tree rather than one grown for shade. Its attractions are creamy-white flowers and long, oval, silvery-green leaves. It does not grow to great height. The bay tree will make itself as much at home in a climate such as that in Massachusetts as it will in Florida sunshine.

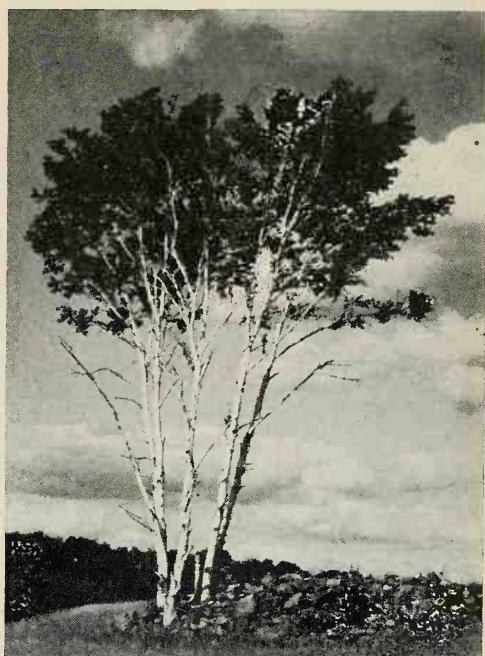
✓ **Beech** (*Fagus*): Here is a good tree for shady spots and one with good form and color, cleanliness and grace. Reaching a height of 75 ft., the beech spreads many branches and bears thin, paper-like leaves that turn bright gold in autumn. Flowers bloom in early spring, and these are followed by three-cornered nuts with edible kernels. The beech is a hardwood tree, and is long-lived and exceptionally free of dead branches, insect pests and fungi. The beech thrives best where the soil is protected by a mulch of its own leaves.

Birch (*Betula*): There are some 28 varieties of birch trees, all tall and slender with thin, peeling bark, but differing in color and average height. The white birch, also called "canoe birch" and "paper birch," grows well in the North. It is about the showiest of the birches, standing from 60 to 80 ft. at maturity. A somewhat smaller tree, the red birch, grows to about 50 or 60 ft. It likes lots of moisture and grows well

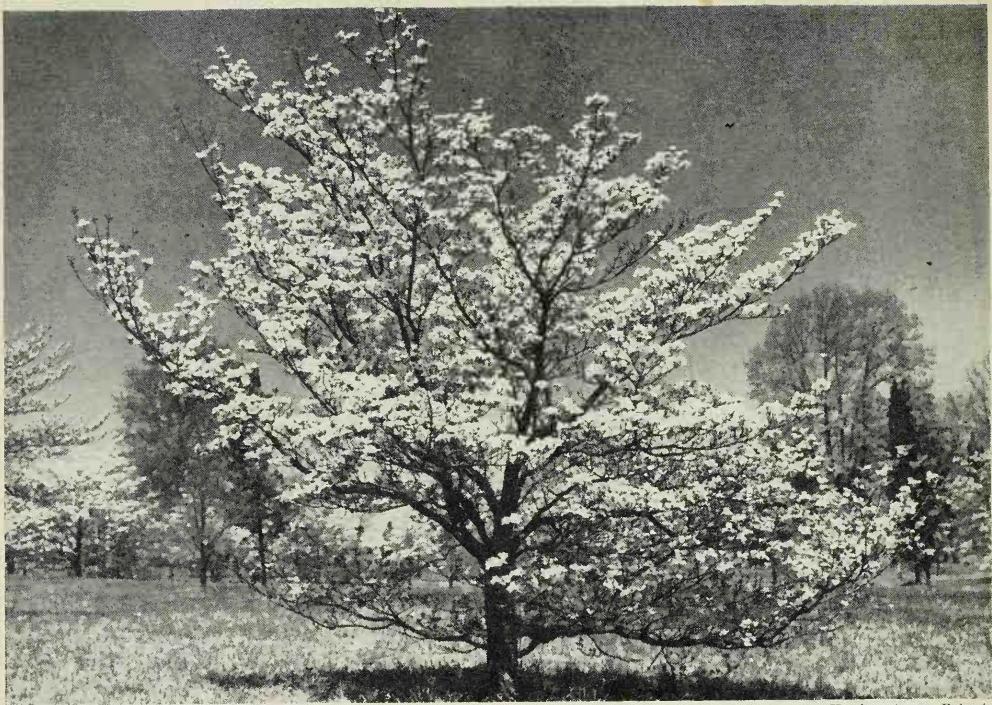
in the West and South. The black birch, averaging 80 ft. at maturity, is at home in the East and Midwest. A native to the Atlantic Coast is the gray birch, which seldom grows taller than 40 ft. In landscape planning, the birches look best near a body of water, where their reflection produces a charming picture. The birch trees look attractive planted against an evergreen background.

Box elder (*Acer negundo*): Not much can be said for this tree. It should be avoided for shade-making, as the branches break off easily and are poorly formed. The leaves also drop off early after attaining a sickly yellow color. However, box elders do grow rapidly, and are sometimes desirable for a windbreak. They grow to a height of about 50 ft. Although a species of the maple, the box elder has few of that tree's virtues.

Catalpa (same botanical name): This is the "Indian bean," or "Indian cigar," tree which grows rapidly and forms a beautiful mass of white or pink flowers in early summer. Be prepared, however, to deal with a nuisance—the narrow bean capsules, 8 to 20 in. long—which drop from the tree in the fall. This tree is good in giving a formal or exotic effect, and in throwing lots of shade. The western catalpa, which bears spotted flowers, is at home in the North. The common catalpa is native to the South.



H. Armstrong Roberts
A clump of birch trees with their milky white trunks contrasting sharply against the dark-green foliage will make a graceful picture on your home grounds



H. Armstrong Roberts

If it's a colorfully blossomed tree you want on your grounds, the flowering dogwood is an excellent choice

and bears large striped and spotted flowers.

Chestnut (*Castanea*): Here is an excellent shade tree with a straight trunk, wide-spreading branches and large dark-green leaves. It also bears nuts after 10 or 12 years. But chestnuts are a risky choice as landscape trees because they are easily killed by chestnut blight, a fungus growth. The American chestnut is slowly being wiped out by this blight, but some of the other species are immune to the disease. Among these are the Spanish chestnut, which grows to 80 or 100 ft.; the Chinese chestnut, a very hardy New England tree that averages 60 ft. high; the chinquapin, or chinkapin, a native species found from Pennsylvania to Texas, which is a shrub-like tree that grows to only about 30 ft. high, and the Japanese chestnut, another small, shrubby tree which bears nuts only when a few years old.

Cottonwood (*Populus balsamifera*): An ideal shade tree for yards from Maine to Florida and as far west as Texas and Montana is the fast-growing cottonwood. Its leaves are clean, glossy and triangular. Long clusters of flowers bloom in early spring before the leaves appear. Although the wood is of poor quality, the tree grows rapidly in almost any soil, sometimes reaching a height of 100 ft. Cottonwoods are widely used as windbreaks where other trees will not thrive.

Dogwood (*Cornus*): One of the most beautiful features of the early spring landscape along the Atlantic Coast is the flowering dogwood tree. It provides a parade of colors with each season—white blossoms in the spring, leaves which are dark green on top and light green underneath in the summer and bright-red berries in autumn.

Elm (*Ulmus*): A beautiful and highly valued tree, the elm has been seriously threatened by the Dutch elm disease, which has threatened to make this tree extinct. Many experiments have been carried on to find the cure for this disease, but none has as yet been found. On the preventive side, however, successful campaigns have been going on to protect and care for the healthy elms. Most of the many kinds of elm trees are tall and possess a certain dignity. The American elm, also known as the white or water elm, is usually associated with New England, but it is found throughout the East. It has a straight, gradually branching trunk and a broad, gently rounded head. The beauty of this tree alone is well worth the effort needed to fight the Dutch elm disease. The Wych, or Scotch, elm is a valuable tree for lawn planting because it does not form the useless stems and buds called "suckers." The Wych grows to 120 ft. and forms a rather oblong-shaped head with spreading branches. The globe elm, a dwarf tree with dense growth, is good for outlin-

ing the path through a formal garden.

Eucalyptus (*same botanical name*): If you live in a mild climate where it seldom gets colder than 22 deg. Fahrenheit, the eucalyptus will make an excellent shade tree. It is a fast-growing tree, and in the summer blossoms with white bell-shaped flowers. The leaves are long, narrow and leathery. Because of the aromatic oil in the wood, this tree is notably free of insects. The eucalyptus is also known as a gum tree. There are the blue gum, which is used as a windbreak in California, and the red gum, a hardy tree that is resistant to drought. The red ironbark, another variety of the eucalyptus, is a tall tree which is good for home grounds in western United States.

Fringe tree (*Chionanthus virginica*):

This tree is so-named because of the fringe-like petals of its fragrant white flowers, which bloom in May and June. Rarely growing over 20 ft. high, this is a good tree to set off your flower garden. It is native to the central and southern states, but will thrive in the North if given a sheltered position and winter protection. The fringe tree should get plenty of sunshine and water.

Hackberry (*Celtis*): This tree looks something like the common elm, to which it is related. However, the hackberry branches do not droop as much as those of the elm and are more nearly horizontal. Also, its leaves are smaller and a brighter green. The hackberry fruit is edible, but the birds get most of it. Also called the nettle tree, the hackberry grows throughout the East and varies in height from 50 to 125 ft. The wide-spreading boughs and light-green foliage of the hackberry give it an airy, cheerful appearance. It grows rapidly, especially when young, is not particular as to soil, will thrive in almost any situation, transplants easily and is notably free from diseases and insects.

Hawthorn (*Crataegus*): The famous hedge tree of England, the hawthorn is used as an ornamental tree in North America. It has white, pink or occasionally red flowers in the spring, and in autumn develops red and orange fruits called "haw apples." Being a low, densely leafed tree, the hawthorn is an excellent lawn specimen. It grows in almost any kind of soil and can be transplanted easily. In pruning this tree, care should be taken to preserve its rugged character. For when it is leafless, the widespread, thorny branches give it a picturesque effect.

✓ **Hazel** (*Corylus*): Delicious filberts come from this tree. The hazel is not as colorful as many of the flowering trees in the spring, for its flowers are very small. The leaves are shaped like long ovals and have teeth along the edge; in the autumn they turn a

rich yellow color, which blends in beautifully with the fall landscape.

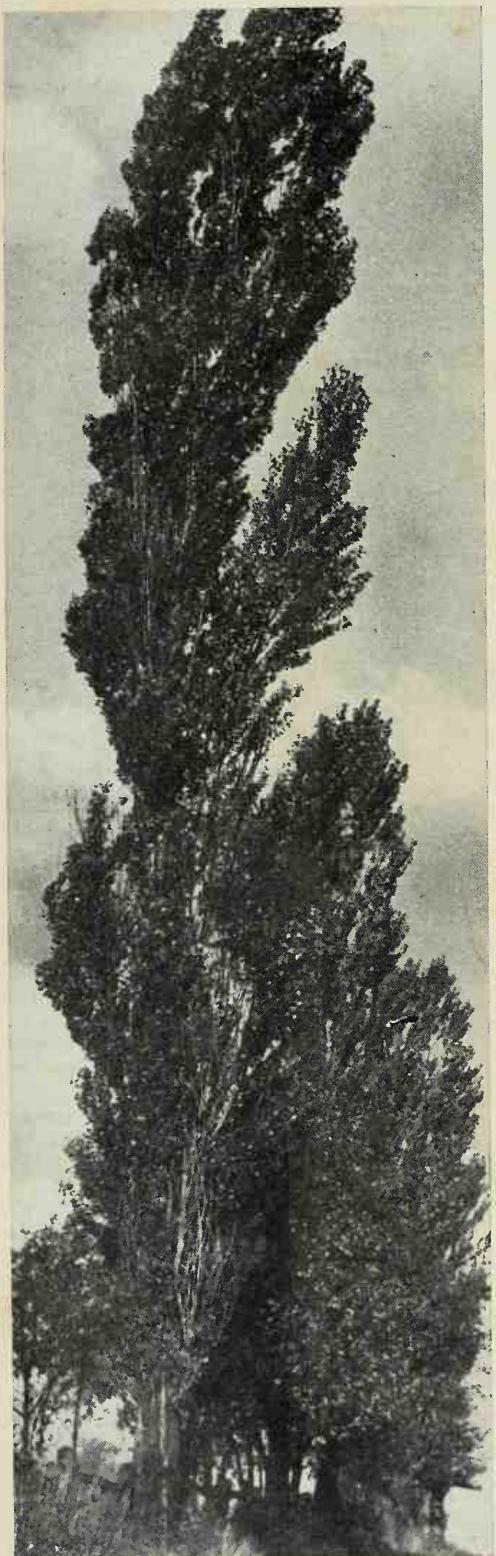
Hickory (*Carya*): If you have a large yard, you might consider planting a hickory tree. It needs plenty of room to grow and spread its stately limbs, resulting in one of the most beautiful of American trees. This is a slow-growing tree, which is difficult to transplant from the wild, so it is best to buy nursery-grown stock. The hickory bears beautiful flowers, and at maturity yields delicious nuts. It should be planted in rich, well-watered soil, although some of the species will grow in dry situations. The only disagreeable feature of this tree is its shaggy bark, which sheds easily and makes the tree an easy prey for boring insects.

Honey locust (*Gleditsia triacanthos*): Reaching a height of 70 to 80 ft., this tree is often planted as a windbreak. The trunk and branches are armed with stout, rigid, three-forked spines, 3 to 4 in. long. The leaves are like feathers, finely divided. The honey locust, also called the sweet locust, has small greenish flowers, which are followed by flat, glossy, brown or black pods. When severely pruned, a row of honey locusts makes a good hedge.

Hop hornbeam (*Ostrya virginiana*): This slow-growing tree, also known as the ironwood, is well worth considering as a permanent tree, especially for dry places. The hop hornbeam has bright-green foliage, which turns yellow in fall, and light-green, cone-like fruits consisting of nutlets enclosed in husks. It grows to medium size.

Hornbeam (*Carpinus*): This small tree, rarely growing over 20 ft. high, is a common sight east of the Rocky Mountains. It is ideal for the corner of a garden with its slender, smooth, blue-gray trunk and rounded head of good foliage. Several of these trees can be planted together and their branches interwoven to form an arbor. The leaves are large, shiny and saw-toothed; they are rarely subject to insect attacks and in the autumn assume attractive tints. This tree also bears light-green fruit clusters.

Laburnum (*same botanical name*): Commonly known as golden chain, this ornamental tree is ideal for lawns in the South. It is not an evergreen, but its glossy leaves stay green until midwinter. Bright yellow flowers cover the tree in summer. The laburnum is a small tree, rarely growing over 25 ft. high, and all parts of it are poisonous to insects. The common laburnum will not survive where winters are severe, but the Scotch laburnum will thrive as far north as Massachusetts. It is stiffer and has a more upright growth than the common species, and it also has longer flower clusters. Both varieties will grow in any well-



drained soil and thrive in city conditions.

Larch (*Larix*): This is the stepchild of the pine family; while all other members are evergreens, this tree is deciduous. The larch has the same kind of needle-like leaves as the pines, but it sheds them in the fall. It also bears cones. In the West and Midwest the American larch is better known as the tamarack. The common larch, another variety, is a native of the Old World, but is often planted in North America for its beauty. Many of the larches fit nicely into the landscape with their stately form and soft texture. They also grow rapidly and do well under almost any condition. They are shaped much like a Christmas tree, with long, straight branches and short, tufted, needles.

✓ **Linden** (*Tilia*): This tree has been planted extensively for its dense, attractive foliage and abundant fragrant, yellow flowers. It is a tall, graceful shade tree which grows well almost anywhere except in very dry climates. You may expect a linden to reach well over 100 ft. at maturity. Its flowers are especially fragrant in warm weather. As a young tree, it is pyramidal in form, but some species become more irregular with age.

Locust (*Robinia pseudoacacia*): The many kinds of locust trees range in size from small shrubs to stately 80-ft. trees. In general, they are straight, handsome trees, which bear heavily scented flowers resembling sweet peas. The blue-green oval leaves grow in double rows on opposite sides of long stems. Locust trees grow very rapidly, transplant easily and thrive under ordinary conditions, even in dry thin soil.

Magnolia (same botanical name): This tree comes in both the deciduous and evergreen varieties. The evergreens are not as hardy as the deciduous forms, but their beauty alone is enough reason for their presence where they will grow. Restricted to the southeastern part of the country, magnolias produce the largest and most spectacular blossoms of all flowering trees. There is no special grace in the form of the magnolia tree, but the glorious mass of flowers transforms it into a delightful sight. The blossoms range in color from white through yellow and pink to purple. The large and shiny-green leaves appear after the flowers have bloomed. The tree is difficult to transplant. The roots should be balled and wrapped, and care taken that the roots are not broken or bruised when reset. The native species should be moved just as growth begins, and the Asiatic varieties must be transplanted *when in bloom*. This is ex-

H. Armstrong Roberts
A popular landscape tree is the tall, thin Lombardy poplar, whose leaves rustle with the faintest breeze. It is a fast-growing tree which gives an immediate effect

ceptional and important because the roots will not heal except when the plant is growing. Pruning must also be done during the growing season.

Maple (Acer): To a Northerner, a good shade tree means a maple, and rightly so as this tree's full rounded top gives excellent shade. In the fall the deeply indented leaves of scarlet, gold and purple and the flat, winged fruits are familiar sights in the North. The sugar maple is one of the most beautiful and symmetrical of this species, and makes an excellent shade and ornamental tree. It does well in any soil and grows to well over 100 ft. high. A tree that is beautiful the year around is the red maple, which grows to a height of 120 ft. The strong, upright branches of this tree make it highly resistant to winds and storm. A smaller variety is the Japanese maple, which seldom grows over 20 ft. It has lobed leaves that are almost circular in form and is a decorative lawn specimen. One serious drawback of most maples is their vulnerability to insects and diseases.

Mulberry (Morus): The American red mulberry tree is related to the silkworm-feeding white mulberry of Asia. The American variety grows along the Atlantic Coast and as far west as Kansas and Nebraska. The shape and size of this tree make it ideal for shade. Its dark, juicy berries, however, are often a nuisance because they attract all the birds in the neighborhood and drop to the ground upon ripening.

Oak (Quercus): The oak comes in some 200 varieties, but only a few are suitable as shade trees. These are the trees averaging less than 90 ft. high as compared to the 150 ft. and more attained by lumber oaks. Common to most oaks are inconspicuous flowers, the acorns, widespread branches and broad trunks. In recent years, a fungus growth, Wisconsin oak wilt, has made oak trees a risky venture. The wilt spreads rapidly and will kill a black oak in two weeks. The oak also comes in evergreen varieties which have holly-like leaves. These grow only in the South, and parts of the West, while the deciduous oaks thrive throughout the United States. The white oak is a majestic tree which grows to 100 ft. high. The pin oak, slightly smaller at 80 ft., is a fine lawn specimen with its regular pyramidal head and long drooping branches.

Osage-orange (Maclura pomifera): Native to the South, but hardy as far north as Massachusetts, this colorful and unusual tree is ideal for the small landscape plan. It is called the osage-orange because it was found in the hunting grounds of the Osage Indians and its fruit resembles an orange. The fruit, however, is too bitter to eat. The tree grows to about 30 ft. high and bears

tiny flowers. Its leaves are broad and make good shade.

Pepper (*Schinus nolle*): You'll have to live in mild climate to enjoy the highly ornamental pepper tree, which is very fragrant after a rain. This medium-sized, bushy tree bears clusters of red berries which mingle with long feathery leaves. There are small white flowers in spring. The California pepper tree is often planted for its shade in that state, but because it is often attacked by black scale is being replaced by the Brazilian pepper tree. This tree is more rigid, has leaves which are dark above and light below and bears bright-red fruit.

Plane tree (*Platanus*): The dense, maple-like foliage of this tree makes it excellent for shade. Distinctive of the plane tree is its mottled white-and-gray trunk, from which the bark peels off in large patches. It grows large and shapely, and thrives best in rich loam soil. Some species will tolerate city conditions, and they will also stand severe pruning.

Poinciana (same botanical name): This beautiful flowering tree is a native of Florida. The flowers are from 3 to 4 in. long with widely spreading scarlet petals, only one of which is oddly streaked and dotted with yellow. Although the tree is most beautiful in the spring, it is also attractive during other seasons with its lacy, fernlike soft-green leaves. The poinciana grows rapidly and develops strong, gnarled trunks and spreading branches which often reach 40 ft. above the ground.

Poplar (*Populus*): Before planting a poplar, check the location of your sewage and underground water pipes. This precaution must be taken because the roots of this tree tend to seek out and clog drain and plumbing pipes. It is therefore against the law to plant poplars along the streets in some cities. Despite this, the graceful beauty of the poplar makes it a favorite landscape tree, especially the tall, thin Lombardy poplar. The special attraction of the poplar is its leaves, which flutter in the slightest breeze to make a sound like falling raindrops. The poplar is a good choice if you want an immediate effect, as it grows rapidly although being short-lived. The lombardy poplar thrives best in the western states. There it attains great size and beauty and fits attractively into the landscape, providing that it is planted among smaller trees to avoid monotony.

Redbud (*Cercis*): A good background for your dark-green shrubbery is the showy redbud tree, which grows in the eastern and western parts of the country. There is also one variety that thrives in the North. The redbud rarely grows over 40 ft. and bears large masses of rose-pink



Leaning over a stream, weeping willows make a charming and graceful picture. Besides being picturesque, willows are good trees to plant near a stream because their roots absorb a lot of water

flowers which bloom before the leaves appear. The leaves are broad and heart-shaped. This tree should be transplanted when small.

Sassafras (same botanical name): Old-fashioned "sassafras tea" is made from the bark of this small, fragrant tree. It is a colorful specimen for the lawn, bearing yellow flowers in the spring, dark-blue berries in midsummer and scarlet-and-gold leaves in autumn. The sassafras is native to the eastern and southern states. It ranges from 30 to 50 ft. in height. Only the very young trees should be transplanted, as older trees have very long taproots. This tree should be planted in light soil in an open sunny location.

Sorrel (*Oxydendrum arboreum*): The bright-green leaves of the sorrel make a good background for a shrubbery border. Also known as the sourwood tree, the sorrel grows wild in the South and as far north as Pennsylvania, Indiana and Ohio. It grows to about 50 or 60 ft. and in the sum-

mer bears graceful clusters of small, bell-shaped white flowers. In spring the foliage is bronze-green, turning to a brilliant scarlet in fall. It does best in a rather acid soil and in partial shade.

Sweet gum (*Liquidambar styraciflua*): This tree, also called the red gum, grows to an average height of 80 ft. Its branches form a pyramid and bear many deeply indented leaves, which become deep red in autumn. The tree is conspicuous in winter with its erect branches, deep-split bark and spiny fruit balls. It grows along the Atlantic Coast and is seen as far west as Texas.

Tulip tree (*Liriodendron tulipifera*): This tree is so named because its large, yellow blossoms resemble tulips. Each petal is marked by a spot of orange. The large, notched leaves are smooth and dark green. It grows to become the tallest broadleafed tree in the eastern United States, reaching as high as 190 ft. The tulip tree is rarely seen west of Wisconsin. It is also known as the yellow poplar because its heartwood is yellow in color. The young trees should be balled and burrapped when moved and transplanted in April.

Walnut (*Juglans*): Primarily grown for its commercial value, the walnut tree also makes an excellent lawn ornament because of its attractive form and cheerful, airy appearance. The vibrating foliage allows breezes to pass through, while it also supplies ample shade. The delicious nuts and the comparative freedom of the walnut from insects are added attractions. The English walnut is the most common and most desirable of the species. It grows from California through the South and along the Atlantic Coast to Massachusetts. English walnuts are hardy in the North if grafted onto the roots of the black walnut.

Weeping willow (*Salix*): For charm and beauty, few trees equal the weeping willow. Its drooping branches and long, narrow leaves look well against almost any background and style of architecture. A single willow is picturesque leaning over a pool. The willow is a fast-growing but short-lived tree. It grows to about 30 ft. and its bright golden or orange twigs add

cheer to the winter landscape. One thing to remember about the willow is that the roots absorb a great deal of water. It is an excellent tree for drying out damp ground, but it may rob surrounding grass and shrubs of needed moisture.

Evergreen Trees

Arborvitae (*Thuja*): The Latin, or botanical, name for this tree means "tree of life." It is so-called because the Romans believed its bark and twigs had medicinal value. Arborvitae resembles the cypress, having flattened branchlets with small, scale-like, waxy and fragrant leaves which overlap like roof shingles. It shapes either as a compact pyramid or a column. The arborvitae grows best in cool and sheltered locations, either in wet soil, sandy loam or sand with water near the surface. It is often used in gardens as screens and shelters for more tender plants. The common arborvitae, also known as the white cedar, is a native tree which grows 50 to 60 ft. high. Thriving in the North and the cool, high altitudes south of North Carolina is the American arborvitae, which grows to about 60 ft. and retains a dense pyramidal form. The Oriental arborvitae is an attractive tree which is much used because of its dense, vertically arranged foliage.

Box or Boxwood (*Buxus*): Found along the Atlantic Coast is the boxwood with its glossy, leathery leaves, which are oval in shape. One of the most beautiful of evergreens is the English boxwood, a dwarf variety of the common species. It is a slow-growing and compact tree with a billowy form. The flowers of a boxwood are very small and grow in clusters or spikes. The tree grows best in well-drained soil and prefers partial shade. Winter protection from sun and wind is required in the North.

Carob (*Ceratonia siliqua*): Native to the Mediterranean area, the carob is used as a shade tree in California and Florida. It looks like an apple tree and bears small white flowers. Also called St. John's bread, the tree grows to about 50 ft.

Cedar (*Cedrus*): This is a confusing tree because so many North American trees are called cedars when they are actually something else. For instance, the red and white cedars are really junipers, and the western red cedar is a form of arborvitae. The deodar tree of India, the North African atlas cedar and the cedar of Lebanon, which is found in Asia Minor, are the real cedars. Only a few species of the real cedars have been grown in this country, and most of these are in the warmer regions. A slow-growing tree, the cedar is a beautiful specimen for the home grounds. It grows best in sheltered gardens where the soil is rich. The cedar is a stately tree with wide-

spreading branches, stiff needles—colored bluish-green, silvery or yellow, depending on the variety—and small, erect cones.

Cypress (*Cupressus*): Here is a long-lived tree which more home owners should try to place in the garden design. Most of the 15 varieties are very attractive—ornamental in youth, picturesque in maturity and with a simple beauty in old age. The cypress was a favorite subject of the famous painter, Vincent van Gogh. Some of the cypress species are dense and bushy. Others are flat-topped with horizontal branching; still others are sharply pyramidal and compact. They have tiny leaves that look like scales; these leaves may be opposite one another and pressed down on the twig or arranged like teeth on a comb. The common cypress is a picturesque tree, shaped like a flame and having thick masses of dark-green leaves. The Monterey cypress, exclusive to California, looks well in a dry rock garden near the sea. It grows to 75 ft., is pyramidal in youth but becomes flat-topped in old age with ascending branches and a bare, high trunk. The bald cypress is an unusual evergreen which sheds its leaves in the winter and can live with its roots under water.

Fir (*Abies*): Another large group of evergreen trees, the firs, also prefers the cool latitudes. They are generally conical in shape and have a particular beauty in youth. When the cones of the fir are new, they are showy in their bright shades of purple, violet, blue, red-brown or green. The needle-like leaves do not grow in clusters as do those of the pine trees, but stick up all along the stiff branches. If you decide to plant a group of firs, use them in the background rather than in an open area. If they are planted in the right kind of soil and obtain the proper exposure, these trees will maintain their fine appearance into maturity. They prefer moist soil and like cool, shady locations. The balsam fir, also called fir pine and balm of Gilead, is one of the hardiest of the species. Growing in the North as far south as Virginia and in the Midwest to Iowa, this tree is about 50 to 75 ft. tall at maturity. The Douglas fir is thought of as a tall timber tree, but there are smaller varieties which can be used in landscape work. Another desirable species is the white fir, a cheerful-looking tree with its light-colored needles and smooth, light-gray trunk and branches.

Ginkgo (*Ginkgo biloba*): Here is an odd-looking but attractive tree. It is sometimes called the maidenhair tree because the foliage resembles the fern of the same name. In youth, ginkgoes are erect and compact, making good borders along narrow streets as well as attractive single trees on the lawn. The tree grows to a height of about



The pyramidal evergreens are well placed in the picture above, as they fit in perfectly in narrow places

120 ft. It bears flowers in loose catkins, which are followed in some varieties by yellowish, foul-smelling fruit. The ginkgo does well in the northern climates and is practically free of insects and disease.

Hemlock or Hemlock spruce (*Tsuga*): Another member of the pine family, this tree can be distinguished from other pines by its leaves and leaf stalks. The hemlock's needles are dark green above and silvery below. They are flat, short and blunt, and attached to all sides of the branches. Small, reddish cones hang from the branches on short stems. The branches droop gracefully under heavy foliage. Generally shaped like a pyramid and growing to about 60 or 70 ft., the hemlock grows from Nova Scotia south to Alabama and Georgia, and as far west as Wisconsin and Minnesota. This tree should be planted where a less formal effect is desired than that given by the fir and spruce. It will stand severe pruning, is easily transplanted and grows best in an acid soil which is well drained.

Holly (*Ilex*): This at one time was the tree used at Christmas time, when it was called the holy tree. With its glossy green leaves and gay red berries, the holly tree grows in the mild climates of the Atlantic and Gulf states from Massachusetts south and around to Texas. The native species grow to an average height of from 40 to 50 ft. and are highly ornamental in the garden.

Juniper (*Juniperus*): The Latin, or bo-

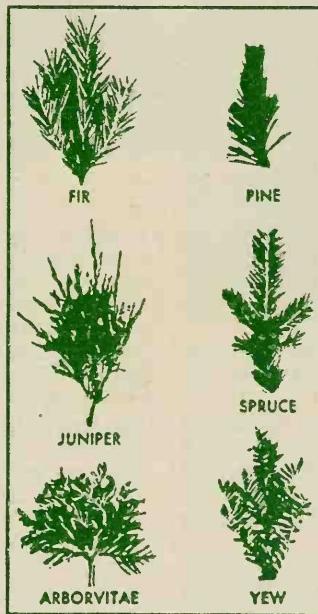
tanical, name of this tree means "forever young." Probably no other tree is as widely distributed in the Northern Hemisphere as the juniper, which can be found almost anywhere between the Arctic Circle and Mexico. The juniper comes in a great number of varieties, sizes, shapes and colors. If you want the tall, slender kind, you can plant the columnar Chinese or red cedar varieties. For quick growth in narrow places, there are the Irish and Swedish junipers. The Greek and variegated Chinese junipers are slow-growing and compact. In general, it is usually the young trees that have the dense, columnar growth. Usually after 20 or 30 years, the top growth slows down or stops, and the branches spread to a dome-like crown. Most junipers prefer a rather dry, sandy or gravelly soil, with full exposure to sun and wind. They will tolerate average garden conditions, but do not like shade and wet grounds. The red cedar is the most valuable and common of the junipers. In size, it ranges from dwarfed columnar forms to wide-spreading or upright-branched trees that grow to 100 ft. The red cedar is useful in framing a beautiful view or as a background for garden ornaments. It should not be planted near trees and shrubs of the apple family as it is a host for one stage of apple rust.

Palm (*Palma*): In many parts of the world, the palm is second in economic importance only to grass. However much we

appreciate this fact, we are here primarily concerned with the ornamental use of the palm. Where palms will grow—in the deserts of southern California and Arizona and along the Atlantic Coast as far north as Virginia—the many species fit well into certain types of landscapes. Royal palms make a dignified frame for landscapes, walks and driveways. Palmettos can be used effectively as a background for the garden. The feathery plumage and beautiful flowers of other palm species give the tropical or semi-tropical garden an interesting touch no other plant can supply. The many kinds of palms have a similar appearance. They all have simple erect trunks, varying in thickness from 6 to 24 in. These trunks can be either smooth, rough or armed with needle-like thorns; their height can range from but a few feet to well over 100 ft. The leaves that grow in clusters are either fan-like or featherlike, varying greatly from species to species in size and appearance. The fruits of the palm trees also come in many varieties; they may be as soft and small as dates or as hard and large as coconuts. The culture of palms differs according to location and species, but certain generalities can be made. Most of them will not endure frost, and should therefore be planted in a protected location. Palms thrive in a sandy soil with well-rotted manure mixed in. Mulching and applications of fertilizer should also be included in palm culture. The leaves that drop from the trees should not be raked away, as they provide a natural humus when they decay. And even though palm trees are associated with dry conditions, water is required for their best success. Hardiness of this species depends largely on age; younger trees might be killed by a cold snap while older trees will come through untouched.

Pine (*Pinus*): Here is another member of the large pine family, which includes such trees as the larch, spruce, hemlock and fir. All totaled, there are some 80 pines, which fall into two groups—the soft pines and the pitch pines. A general description can be given to them. The trunk of the pine is straight and tall, sometimes reaching a height of over 200 ft. The shape of the tree

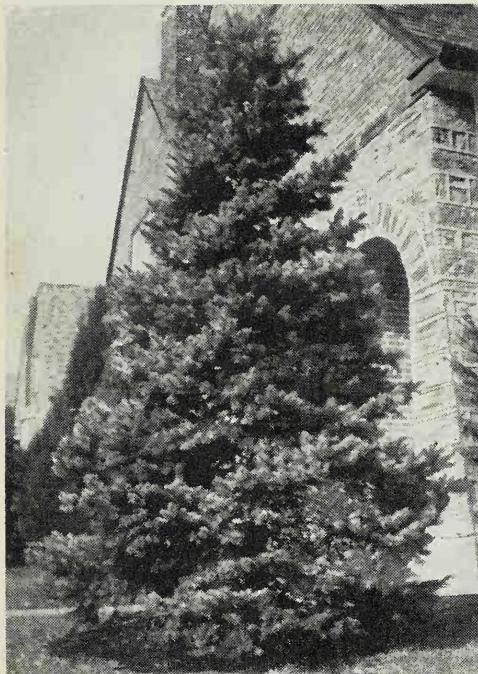
may be either round or pyramidal. Its bark is usually thin and scaly. Pine needles are, of course, familiar to all, growing in clusters on small branches which stretch out from the tree. There is a sheath at the bottom of each cluster to cover the leaves; it falls off the soft pines when the new leaves develop, but stays on the pitch pines. Depending on the species of pine, the cones are anywhere from 1 to 18 in. long and bear the seeds between the scales. A pine tree will grow well in almost any soil, but it does best in sandy highlands. The pine will not last long in smoky cities, as the gases in the smoke are believed to choke the tree. You will have little success in transplanting a pine from the wild because of the long taproots that anchor the tree to the earth. If you want pine trees on your premises, you will have to get them from a nursery, where the trees have been transplanted many times and their roots pruned to develop short, fibrous systems. It is especially important that pine roots not be exposed to air unless protected by a ball of earth. As there are so many species of pines, you can find one for almost any situation—fast or slow-growing kinds, those with light silvery foliage and others that display a somber green appearance. Most of these trees grow to 100 ft. or more in height, but there are a few species that are medium-sized or dwarfed. There is one thing you should keep in mind about



The illustration above, will help you identify various needle-shaped leaves of evergreens. There are also several broad-leaved varieties

all pines—they love light and should therefore be kept out of shade, where they will become scraggly and unsightly. The most important of the soft pines is the white pine, which is attractive at almost any stage with its great trunk and widespread branches. Because of its popularity in Maine, the cone and tassel of the white pine are used in the state emblem. For background planting, there is the red pine. A contrasty variety is the Scotch pine with its short, bluish-green needles. The Swiss mountain pine is a shrubby tree which fits well into a wild garden near the seashore because of its irregular growth.

Pinon (*Pinus*): Perhaps at some time you have eaten the delicious pine nuts that come from the pinon tree, another member of the pine family. Found in the southwest-



A single large evergreen tree is always an attractive feature of landscaping on large or small lots

ern United States and Mexico, the pinon is a relatively small tree, ranging from 10 to 50 ft. Its shaggy, spreading branches are often twisted by the wind. The needles are shorter than those of most pines, ranging from 1 to 12 in. long.

Rhododendron (*Ericaceae*): Also listed under shrubs, for which see page 94. The tree variety of the rhododendron is variously called the great rhododendron, great laurel and rose bay. Even the tree variety rarely grows higher than 35 feet. It grows profusely in the Allegheny Mountains. Its bell-shaped flowers are white or rose-colored. The rhododendron is a member of the heath family. It has a rugged beauty that blends well in an informal landscape.

Spruce (*Picea*): The spruce family claims some 40 varieties of trees. Most of them do best in cooler climates, but some thrive as far south as North Carolina and Arizona. The needles of the spruce are four-sided and less than an inch long. They grow in spirals around the branches, pointing in all directions. The cones hang straight downward as contrasted to the fir cones, which stand straight up. Provided that there is good drainage and plenty of moisture, the spruce will grow in almost any kind of soil. Shallow rooting habits make the spruce easy to transplant. The Norway spruce is a pyramidal tree with horizontal branches and drooping branch-



Here a planting of alternate shrubs of different varieties is effective in screening a large entryway

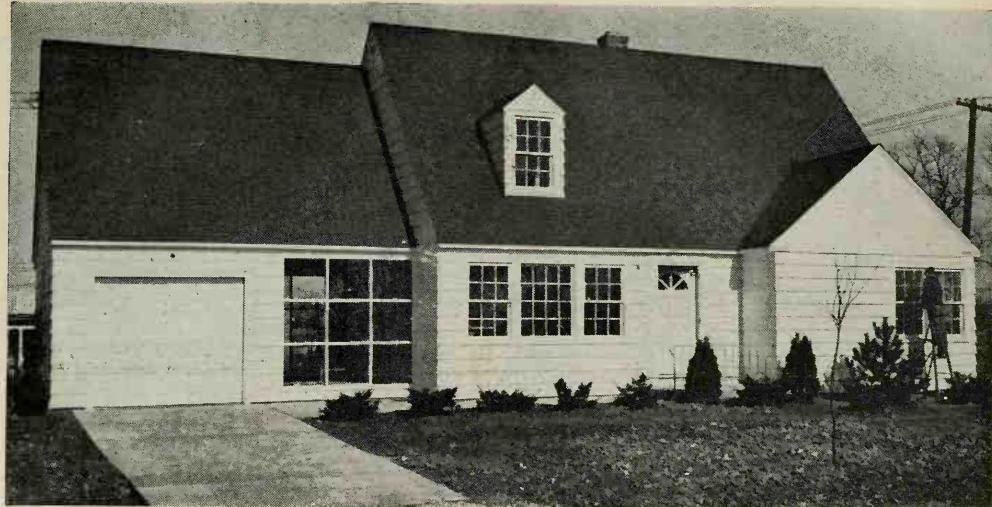
lets. It grows to about 150 ft. While attractive in youth, the Norway spruce often becomes unsightly when older. The white spruce, with its close, dense foliage, is a highly ornamental tree. It averages 70 ft. at maturity and has a strong, aromatic odor. The Engelmann spruce is a slender, pyramidal tree that often grows as high as 150 ft. A tree with striking coloring is the Colorado spruce, which should be planted with discretion because of its brilliant foliage. This tree ranges from 80 to 150 ft. in height.

The famed lumber tree, the Douglas spruce, or Douglas fir, is of a different genus, but is related to the spruces.

The red spruce grows almost everywhere in the North, the New England States, and in parts of the Middle West. Some of them are found in the Arctic Circle, where they are the size of shrubs, although they attain heights of 100 feet in warmer climates.

Except for large estates, most spruce trees are unsuitable for landscaping because of the tremendous height they reach.

Yew (*Taxus*): This is a slow-growing tree, which varies in size from a foot-high bush to a 60-ft. tree. The leaves are flat, pointed needles, dark green on top and lighter green beneath. The bark is reddish-brown and scaly, and the tree bears scarlet berries. The trunk often becomes very thick and the tree may live for hundreds of years. This tree will grow in any ordinary soil with plenty of humus and does equally well in shade and sun. The English yew thrives in a mild climate, living to a very old age. It grows to about 60 ft. high and has a short, wide trunk and a broad head. The Japanese yew comes either in the spreading or upright form. Some kinds grow as high as 50 ft., while others are low and shrub-like.



The low bushy shrubs under the windows and the taller species in front of the door are well placed

Shrubs and vines for the home grounds

OF THE THREE broad classifications of woody plants—trees, shrubs and vines—we have discussed the first and are now concerned with the two remaining groups. The woody plants are distinguished from other plant life in that they produce wood and have buds above ground. It is difficult to draw sharp lines between trees, shrubs and vines, as they often overlap one another. We have, therefore, arbitrarily classed the various plants according to the uses to which they are most commonly put by the home gardener. There will be some species that will appear in more than one list because their varieties fit in the different groups. Some readers may raise a questioning eyebrow at finding flowers such as the rose, rhododendron and azalea among the shrubs. These and other blossoms are listed with the shrubs and vines because they are primarily woody plants.

Planting Shrubs

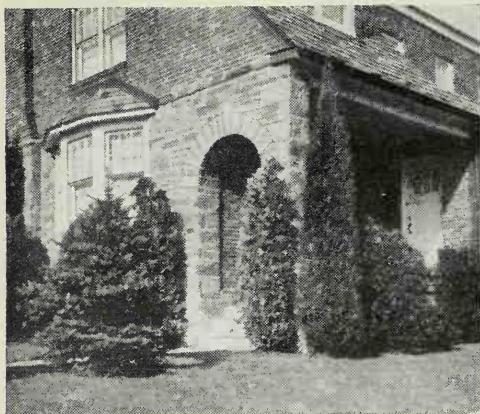
The functions of shrubbery in the home landscape plan were discussed in Part 1. You will want to consider carefully how, where and what kinds of shrubs you are going to place on your home grounds. These will be permanent plantings, their main purpose being to beautify the landscape, so your planning cannot be too careful.

Many of the instructions for planting shrubbery are the same as those for trees, and in these instances you will be referred to the preceding section. Here again we advise transplanting as the most satisfactory means of getting shrubs established. A reliable nursery is the place to get the plants,

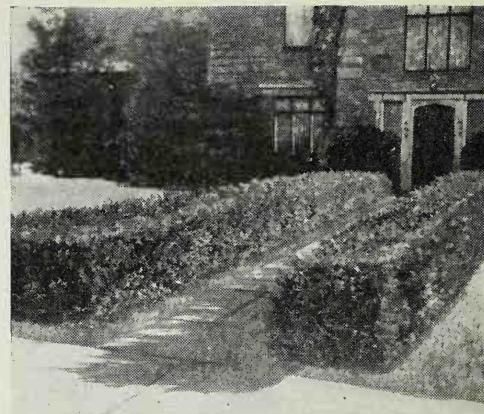
and balled and burlapped stock is recommended for the best results. In most cases spring or fall is the best time to transplant shrubs. Planting in the spring should be done before the leaves develop, unless the plant has been moved with a ball of soil around the roots. If you choose to plant in the fall, wait until the leaves have matured and active growth has stopped, but before the ground freezes. There are plants, however, that must always be transplanted in the spring. You should therefore get complete planting instructions from the nursery when you purchase the shrubs.

Soil preparation: There are certain soil preparations that you should make before the shrubs are delivered. The first requirement is to have plenty of good, rich topsoil ready, at least 2 or 3 ft. deep. Most shrubs will need humus-forming material added to the soil. Humus, compost or well-rotted manure should be placed near the feeding roots and under the plant. Whether plant food should be added and in what quantity will depend on the type of soil and the food requirements of the plant. Well-rotted stable manure will benefit most plants except those growing in acid soils. If phosphate is needed in the soil, either superphosphate or bone meal can be used. It is neither necessary nor advisable to use chemical fertilizers at the time of planting. If you are planting the shrubs near an established lawn, precautions should be taken to protect the grass. This can be done by placing burlap or canvas over the lawn on which the soil dug out of the holes can be piled.

The hole in which the shrubs are to be



The photograph above shows an example of planting evergreens and deciduous shrubs in an arrangement that copies the rambling outline found in nature



The precise lines of the border hedge above guide the caller directly to the entrance door. A well-kept hedge like this is an asset to any property

placed should be deep and broad enough so that the roots can spread out naturally and comfortably. Allow from 6 to 12 in. on all sides of balled plants. Dig the holes deep enough so that the plant food can be placed under the roots. In filling the hole, the same procedure used for trees (page 66) can be followed. When two-thirds of the hole has been filled, however, the shrub should be untied so that the best side of the plant can be faced in the direction from which it will most often be seen. If the shrub is to be viewed from several directions equally, some compromise will have to be met so that the plant looks well from all these views. One other point should be added about filling in the hole around the shrubbery roots. Leave a saucer-like depression with a rim of soil around it at the top. This makes a basin for the thorough watering which will be needed for many weeks while the plant is getting established. The extra soil around the rim can also be used for filling in the hole later if there is a great deal of settling.

After-planting care: As with trees, some shrubs will also have to be staked, especially if they are high-headed and tend to be top-heavy. Even regular shrubs of the common oval shape are better staked so they will not be torn loose by the rocking motion caused by high winds. If the wind is predominantly from one direction, one stake may be enough. Where only one stake is used, there is a chance of damaging the roots because it must be driven into the earth close to the plant. To avoid this, place the stake in position at the same time that the shrub is put in the hole for planting, so that you can see what you are doing and avoid the big roots. The three-stake method, however, is more satisfactory. It is discussed on page 70.

Newly planted shrubs need plenty of water until they are well established. This means a good soaking about once a week or every 10 days throughout the first season after planting. Watering can be cut down during damp weather, but anything less than a half-day's rain will not count. The leaves of the shrubs should be dampened from time to time when the weather is hot and windy.

You will have to keep an eye on the shrubs for several weeks after planting. Watch to see that the plants do not settle too much, tip out of position or develop any other unnecessary handicap. If you find that the plant has settled too much, lift it out and replant before the new roots develop. Should the shrub tilt badly out of position, you may have to re-dig the hole and replant. Where there is only a slight tilt, it may be possible to pull the plant back into position with a guy wire leading away from the direction of the tilt. This is advised only if the shrub is large, or too well established to disturb, or if the tilt is so slight that it just needs a little pull from the other direction to counteract it.

A mulch will be helpful over the root system of the newly planted shrub, especially if you are planting late in the season. Hay, straw, compost or half-rotted manure all make good mulch. The layer should be thick enough so that the soil does not dry out or freeze before the plant can get established. A mulch is particularly important to evergreens, as their feeding roots are close to the surface.

Renovating the Shrubbery Border

If you have just bought someone else's house, you may want to do something about the existing shrubs. Perhaps they have been planted too thickly or with little taste



When you select flowering shrubs for your grounds, choose them with discretion. One suggestion is to have contrasting blossoms like spring beauty, above, and hibiscus, at the right



as to form and color combinations. Or maybe you would like to replace or add to some thin, scraggly bits of shrubbery. Look at your home grounds from various views—from your doorway or out of windows, from the street or various property lines. Does your house look as though it is in the midst of a jungle? Or is the effect bare and unfinished looking? Are there some plants that are but a mass of unsightly stubs and rotten wood? The mental notes taken at these various spots will help you determine what you can do to make your grounds as attractive as possible.

Planning: Your starting point will be to find out as much as you can about the shrubs already on the property—what kind they are and about their growing habits. Then you will know which of the plants is wrongly placed. The next step consists in dividing the shrubs into three classes: (1) those to be dug out and thrown away; (2) the plants that should be transplanted to a more suitable spot; (3) the shrubs which are satisfactory as and where they are. All the shrubs on your grounds are to be marked by a piece of string or scrap of cloth, a different color representing each group. After all the plants have been thus marked, you can get a fair idea how much work and expense will be involved in "face lifting" the shrubbery borders.

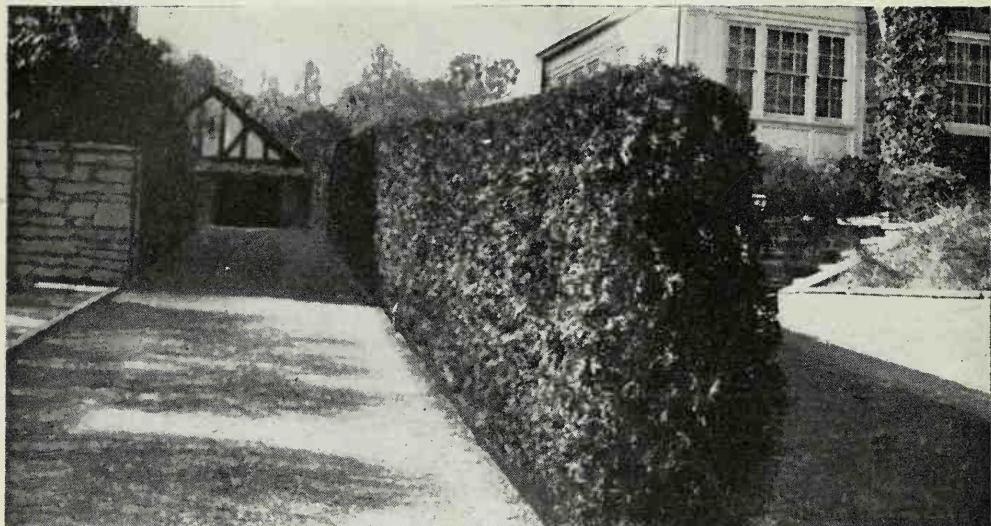
Although there can be no set rules as to which of the above groups any plant should be put in, the following suggestions may be of some help. If you have any needle-leaved evergreens whose needles have either turned brown or fallen off, you might as well get rid of them. No amount of nursing will bring these plants back to good health. The fast-growing, inexpensive shrubs which are ugly or dead can also be marked for removal. Among the group of plants to be moved elsewhere are those of

rare variety and shrubs which would be more appropriate in another location. These include broad-leaved evergreens in good condition but incorrectly placed, and flowering shrubs and other plants in good health which would look better somewhere else. Most broad-leaved evergreens are rather expensive, and they respond fairly well to feeding and care, so they should be saved whenever possible. Then there are those plants which can be left where they are because their shape, variety or general effect is pleasing in the landscape.

Perhaps there will be some good plants which will have to be discarded simply because there is no place to put them. Many shrub borders are crowded because the plants were placed too close together. The only course here is to take out some of the plants to relieve the congestion.

When you have decided what to do with all the shrubs, those to be transplanted should be marked as to where they will be moved. It would be advisable to put your plan down on paper, so you will have some idea what the final outcome will be.

Working out the plan: Now you can put on your overalls and get ready to do some really hard work. The first task is to dispose of all the plants you want to get rid of. Dig them out, root and all. It is important that no roots are left behind, because new shoots may spring up from them and start a new plant, and you would eventually be back where you started. Transplanting is the next step. If you have several large and valuable specimens to be moved, it is best to have a nursery do the job for you. Should the expense of this transplanting be too much, it may be more economical to throw out the large plants and start all over again with smaller specimens. But if you decide to keep the large specimens, they should be moved first. Any plant should be



A single variety of plants of the same age, all planted at the same time, is responsible for this ornamental hedge

dug up with a good ball of soil and burlapped carefully, unless the root system is very fine and fibrous and dirt holds to it well. It is particularly important that large shrubs and flowering plants be balled and burlapped. This operation should be carried out with the utmost care. There is no sense in transplanting carelessly only to have to nurse the plants back to health. The time and manpower needed to transplant a shrub will depend on the type of soil and size of plant. It is easy to dig into sandy soil, while it takes twice as long to work in a rocky or heavy clay soil. A shrub 10 ft. high with a 6 or 7-ft. spread growing in a fairly good garden soil will take about four men from three to five hours to dig and transplant properly.

The same rules apply as to the size of hole, filling, watering, feeding and tamping as in transplanting nursery-bought stock. The job of renovating the shrubbery border is a long and tedious one, so take your time doing it. You don't have to complete it in a single season. Perhaps two, three or more years can be spent in moving your shrubs about. You may need all this time to get rare and valuable specimens into better condition. It is dangerous and often disastrous to move an unhealthy plant. Also, if you do all your renovating in a single season, the result may be a mass of meager-looking plants. By transplanting only a few shrubs at a time, you will always have some established ones that look presentable.

Selecting Shrubs

The final choice of shrubs for your home grounds will be based on personal prefer-

ence. Before this point is reached, however, other factors must be considered. You would certainly not use a shrub spare of branches and thinly leaved in a windbreak simply because you like that certain species. Nature has given each species of shrub a purpose or purposes to fulfill. Some are versatile, while others are limited to one virtue. Thus your choice will be cut down somewhat to that which is most suitable for a given location. You should also know the habits of the shrubs you use. How fast do they grow? Do they tend to be upright or spreading, narrow or broad, open or dense, formal or picturesque? One thing must be understood at the outset—no amount of pruning or transplanting will change the habit of a plant. So make up your mind whether it's height or width you want and select the appropriate shrub.

The kind of leaves that the shrub has may influence your choice. The color, size, shape and arrangement of the leaves are well worth knowing before the final choice is made. In general, the gray-greens, yellow-greens and reddish-greens should be used sparingly and only for special purposes; the dark-greens are most effective in emphasizing deep recesses; the gray-greens give an illusion of distance; for the bulk of the planting ordinary leaf-greens are most satisfactory. Many shrubs are selected on the strength of their flowers alone. If you want more than one kind of flowering shrub on your grounds, choose them with discretion. Select and place flowering species so that their color will blend or harmonize. It's also a smart idea to plant shrubs so that there will be successive blooming rather than all at once. In this way you can

enjoy beautiful blossoms for several months. When you are deciding what flowering shrubs to plant, keep in mind the blossoming trees and other flowers that are already on your property or which you plan to include in the landscape.

With these suggestions in mind, you can now read through the following list and select shrubs, which are both appropriate to your landscape and to your liking. Here the plants have been divided into deciduous and evergreen sections. Some species of shrubs come in both the deciduous and evergreen varieties. In such instances, these have been listed with the first group unless the species is predominantly evergreen.

Deciduous Shrubs

Acacia (*same botanical name*): Of the many varieties of this species, the wattle blossom is the most important for landscaping purposes. It grows only in warm climates, and in this country is most commonly found in California. Especially conspicuous are the feather-like leaves of this shrub. In some species of acacia the leaves are flattened stems, while in others they are spines. Most acacias bloom profusely, having tiny yellow flowers in fluffy balls.

Aralia (*same botanical name*): A group of aralia shrubs on the lawn or a single one as an accent plant will give an imposing effect. Most aralias are hardy in the North and will thrive in any good soil. These shrubs have extremely long and broad leaves, and bear small creamy white flowers and soft, black, juicy berries. Their height varies from 6 to 9 ft.

Baccharis (*same botanical name*): This plant comes in both deciduous and evergreen varieties. Most of them grow from 5 to 12 ft. high. The small white or yellowish flowers of the baccharis, which bloom late in the summer, are followed by shiny white bristles of fruits. Most of the species grow easily in any well-drained soil in a sunny position. They are also good for planting on dry, rocky slopes and on the seashore. The hardest and most used of the species is the groundselbush, which grows to 12 ft. and is found along the Atlantic coast from New England south and around the Gulf Coast to Texas.

Barberry (*Berberis*): The 175 species of the barberry, both evergreen and deciduous, are among the most useful and ornamental of shrubs. The flowers are not large, but there are enough of them to make the plant colorful through spring and summer. Some of the deciduous varieties have excellent berries. The common barberry is highly ornamental with its drooping clusters of coral-red berries, but its cultivation is prohibited in wheat-growing regions be-

cause it is a host to wheat rust. The Japanese barberry is a good hedge plant as well as useful in general planting. And for low hedges, the box barberry is a good choice.

Beauty bush (*Kolkwitzia amabilis*): Although it takes a while to flower, the beauty bush becomes a glorious flowering shrub in May and June. The shrub must be well established before the blossoms appear. These flowers are bell-shaped, in a soft pink color with yellow throats. The shrub has an upright form and averages 5 to 8 ft. high. It is best placed in near-by borders.

Bluebeard (*Caryopteris ancana*): If you want a late-flowering shrub, the bluebeard, whose dense flower clusters appear in September, is recommended. It is a showy shrub with white or lavender flowers. The tops are usually killed back during northern winters, but new shoots appear the following spring and flower in the same year. The leaves are aromatic and have an attractive grayish-green tone. A well-drained soil and a sunny position are required by the bluebeard.

Broom (*Cytisus*): There are some leafless brooms as well as the deciduous and evergreen kinds. The main requirements for growing broom shrubs are full exposure to the sun and wind and perfect drainage at the roots. Poorer soils are preferred to rich. The taller kinds have to be pruned back after flowering to prevent them from becoming seraggly. The scotch broom, with its bright-green stems and yellow flowers, has a sprawling habit and is good for planting on dry gravelly banks. The Spanish broom is slender and has white blossoms.

Butterfly bush (*Buddleia*): This is a vase-shaped shrub that averages 7 ft. high, growing swiftly and coarsely to attain this height. The flowers are small but grow in large numbers; they are usually lilac in color, but some of them are white or yellow. Nearly all the flowers have an orange eye and a sweet fragrance, to which butterflies are attracted. The shrub grows best in a well-drained soil in the sun.

Chokeberry (*Aronia*): The shrubby border or wild garden will accommodate this shrub nicely. It is not choosy about growing conditions, although it has a liking for a rich soil on the moist side. Attractive white flowers in the spring and colorful leaves in autumn are further recommendations for this shrub. The red chokeberry bears lots of red berries which stay colorful most of the winter. The dark-purple fruit belongs to the purple chokeberry. Then there is the black chokeberry, whose shiny black berries ripen in August.

Cotoneaster (*same botanical name*): This large group of deciduous and evergreen shrubs is outstanding for its good habits of growth and colorful fruit. Some varieties



Flowering dogwood has a simple but pretty blossom

are conspicuous because of white flowers and others for their brilliant coloring in fall. All of them do best in an open, sunny position in a well-drained soil. The Peking cotoneaster, with pinkish-white flowers and black fruit, is useful for mass planting or for hedges. The spreading cotoneaster has red fruit which load the branches throughout the winter. The *diels* variety has pinkish-white flowers and scarlet fruit; it is good for mass, foundation or single planting.

Crab apple (*Malus*): The beauty of the flowers and tastiness of the fruit when properly prepared are reasons enough for planting this shrub. The crab apple is well suited to the climate of the northern states, but does not grow successfully in the South except in the mountains. The fruit can be used for jelly making, each variety having a slightly different taste. Practically any crab-apple shrub is good for ornamental planting. The southern crab has large pink or rose flowers and grows to 25 ft. The carmine crab is the showiest of the species with its rose-colored blossoms. The Japanese flowering crab has profuse, large-red flowers which fade to pink and then to white.

Daphne (same botanical name): Here's another good choice in a flowering shrub. Both the evergreen and deciduous kinds grow best in a well-drained sandy loam well supplied with leaf mold. The *mezereum* variety, whose lilac-purple flowers appear before the leaves, is well placed against evergreens. The garland-flower bush, a low evergreen with dense clusters of fragrant pink flowers, blossoms twice during the year. Another evergreen variety is the spurge laurel, which averages 4 ft. and has large shining green leaves with yellow-green flowers in early spring.

Deutzia (same botanical name): An at-

tractive shrub in early summer, this plant has a wealth of white flowers, some tinged pinkish. Most of the varieties are not hardy in the North unless placed in a protected position. The deutzia does best in a well-drained soil with plenty of humus. It averages 3 to 6 ft. high, is usually oval-shaped and looks good in front of a garden border.

Dogwood (*Cornus*): Also listed with trees, for which see page 74. The shrub varieties of the dogwood are very colorful. There is the tatarian dogwood, an upright plant about 10 ft. high with blood-red branches, creamy white flowers and white or bluish tinted fruits. The purplish branches and yellowish flowers of the silky dogwood are a common sight from Massachusetts to Tennessee. The red osier dogwood with its red blossoms, 8-ft. height at maturity and broadly oval shape is good for planting in distant borders. One of the earliest spring-blossoming plants is the cornelian cherry, a dogwood variety which has yellow flowers and red fruits and grows to 20 ft. high.

Elder (*Sambucus*): A large coarse shrub with compound leaves, showy clusters of white flowers and red or black berries, the elder shows to good advantage when planted in groups. This plant grows best in partial shade and rich, moist soil. The European elder grows to 30 ft., bearing yellowish-white flowers and purplish-black berries. The American or sweet elder is a colorful shrub in bloom with its flowers growing in clusters to 10 in. across. It averages about 12 ft. in height. Wine and jelly can be made from the fruits of some varieties of the elder.

Euonymus (same botanical name): Commonly known as the spindle tree, this group of deciduous and evergreen shrubs is at home in temperate climates. It will be healthy in either sun or partial shade and in almost any kind of soil. The flowers are inconspicuous, but the colorful fruit makes up for that. The deciduous forms thrive in the North, but only a few of the evergreen varieties can withstand freezing temperatures. The evergreens do, however, make excellent hedges, thriving under city and seaside conditions. The running strawberry bush, a prostrate variety, makes a good ground cover in shady places.

Forsythia (same botanical name): Golden bell is another name for this shrub with the brilliant yellow flowers. Besides being one of the showiest of spring flowering shrubs, the forsythia also has attractive foliage, its slender leaves lasting well into fall when they turn olive or purplish. This is a hardy shrub which does well in almost any soil in shade or sun. The fortune forsythia, with canary-yellow flowers, is good for planting in distant borders. The weep-

ing forsythia is excellent for massing on banks or drooping over walls. It grows as high as 9 ft.

Fuchsia (*same botanical name*): Here is an old favorite which can be grown the year around in mild climates and during the summer in the North. It is also known as lady's eardrop because of the shape of its flowers. Fuchsia shrubs grow rapidly, producing long branches which end in a profusion of drooping flowers—rose, red, purple or white in color. They grow best in a medium-rich garden soil with some leaf mold mixed in, a rather humid atmosphere and partial shade. If you start the plants from seed, this should be done in the greenhouse in January or February. Set the seedlings outdoors in May. It is more common to grow fuchsia from root cuttings.

Gordonia (*same botanical name*): The glossy foliage and waxy flowers that resemble camellias make gordonia a bold specimen near the house or in the garden. It has both evergreen and deciduous forms. The bright-green leaves, which are often 6 in. long, turn red in the fall. The flowers are creamy white and cup-shaped. Gordonia shrubs are hardy as far north as Massachusetts if planted in a sheltered position in a moist, acid soil. Varying in height from 6 to 20 ft., they are usually restricted to a single planting.

Hawthorn (*Crataegus*): Also listed with trees, for which see page 75. The cockspur thorn is the most popular of the hawthorn shrub varieties, having wide-spread branches covered with long thorns. Conspicuous flowers are followed by small red fruits, which often remain on the tree all winter. The shrub often grows to 40 ft., but can be kept bushy by pruning. When several of these shrubs are set close together in a hedge, the long sharp thorns make an almost impenetrable border. This shrub can also be planted singly.

Hibiscus (*same botanical name*): Of the four groups of hibiscus plants—annuals, herbaceous perennials, tropical shrubs and trees and hardy shrubs, we will here be concerned with only the last mentioned. The rose of Sharon, also known as the althea, is the most popular of this group. Its chief value lies in the late blooming season of its flowers, which range in color from white to pink, red and bluish-purple. Some altheas have double flowers. They thrive best in a well-drained soil, doing remarkably well under city conditions.

Honeysuckle (*Lonicera*): A versatile plant is the honeysuckle, an easily cultivated shrub which is not particular as to soil and does well in partial shade as well as in the sun. There are bushy kinds of honeysuckles which are useful in mixed-shrub planting or for screening purposes.



U.S.D.A.

The hanging blossoms of the fuchsia droop gracefully

Some varieties become quite large if grown as a single specimen with ample room for development. The climbers are good for training on fences and trellises.

Hydrangea (*same botanical name*): Almost everyone is familiar with the huge clusters of white, pink or blue flowers that belong to this shrub. For growing conditions, it calls for a rich moist soil and an open location. Severe pruning will be needed to encourage good flower heads. Although several varieties are hardy in the North, most success can be had with hydrangea growing by tying this plant up in late fall and banking soil around it. Since blue hydrangeas often turn pink if the acidity in the soil is decreased, plant these shrubs in a sandy soil to which peat moss, leaf mold or any other kind of acid-creating material is added.

Jasmine (*Jasminum*): You'll have to live in a warm climate to grow this shrub. There are deciduous and evergreen varieties. Some jasmine varieties have a climbing habit. One of these is the jessamine, which grows to 30 ft., has glossy compound foliage and clusters of white, fragrant flowers in summer. The *primulum* jasmine is a rambling, free-flowering shrub whose flowers are pale yellow with darker centers. The Spanish jasmine is bushy with slender branches and clusters of white flowers tinged pink. Most jasmines thrive in a good garden loam.

Kerria (*same botanical name*): Having a sprawling habit, this shrub is suitable against walls. The Japanese kerria, the only species, has abundant single yellow

flowers in late spring and often a scattered blooming throughout the season. It grows to about 8 ft. and likes a well-drained sheltered soil in partial shade. The light-green twiggy stems are attractive even in winter, although they may be killed back at the top if exposed to too much freezing weather.

Leucothoe (*same botanical name*): Only a few kinds of leucothoe shrubs can be grown outdoors in the North. A moist, sandy peat soil and partial shade are the best growing conditions for this plant. Sweetbells, a deciduous variety, is an upright grower to about 10 ft. which is found from Massachusetts to Florida. The species *catasbaei* is one of the handsomest of broad-leaved evergreens. It averages 6 ft. high, has arching branches, large shiny leaves and white flower clusters.

Lilac (*Syringa*): In the flowering-shrub group the lilac is the most popular, as it is easy to cultivate, free-flowering and very ornamental in bloom. Although it prefers a rich, well-drained soil in an open area, the lilac will grow in almost any other kind of location. The plant likes lime and responds well to applications of well-rotted manure from time to time. If the shrub gets scrawny, it can be renovated by cutting back all the way to the ground in early spring, from which a new plant will arise. There are many varieties of the lilac. The Chinese lilac has large clusters of purple flowers and is good for border planting. Creamy white blossoms belong to the Japanese lilac, a tree-like sort which is valued for its late flowering. The Persian lilac is a profuse lavender-flowering variety. Then, of course, there is the common lilac, the old-fashioned kind that blooms in May.

Locust (*Robinia*): Also listed with trees, for which see page 76. The rose acacia is a shrub variety of the locust, found only in the southeastern part of the country. Rose acacia averages 9 ft. high, has rose-colored blossoms, and its stems, branchlets and pods are covered with reddish bristles. Because it grows many useless branches, called suckers, the rose acacia may become a nuisance in the border, where it will crowd out less aggressive shrubs.

Lycium (*same botanical name*): Known commonly as the matrimony vine, or box-thorn, this plant is found in the warmer climates. It is usually a spiny shrub with a loose, clambering habit, which makes it well suited for planting against walls and fences. Whether deciduous or evergreen, lycium varieties are not particular about soil, but like dry places. This plant also

suckers freely, so should be placed where it will not crowd out other plants.

Magnolia (*same botanical name*): Also listed with trees, for which see page 76. Two shrub varieties are worth mentioning. The variety *soulangeana* blooms generously, its flowers being 6 in. across, white inside and a brilliant purple outside. The hybrids have blossoms of other shades—white, rosy and red. The starry magnolia has narrow-petaled flowers about 3 in. in diameter, which are among the earliest of spring blossoms. This bushy shrub grows to about 15 ft. high.

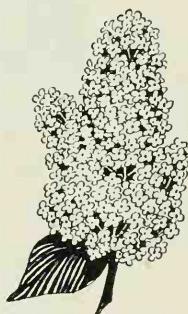
Mock orange (*Philadelphus*): Another attractive flowering shrub of medium size, this plant has white or cream-colored flowers, which blossom in early summer. Most

of them are hardy in the North, where they grow in any kind of soil so long as it is not soggy or poor. They can also stand shade better than most flowering shrubs. The mock orange varies from 4 to 10 ft. high, is oval-shaped and makes a good plant for borders.

Pearl-bush (*Exochorda racemosa*): Here is another good choice for the garden or near-by border. It is an attractive spring-flowering plant, with capsular fruits like winged seeds following the white blossoms. If the shrub becomes scraggly at the base, this can be corrected by cutting back and removing some of the old wood after flowering.

Photinia (*same botanical name*): The deciduous forms of this shrub are hardy in the North, but the evergreen kinds can stand but a few degrees of frost. Both kinds like light, sandy loam. The Chinese Christmas berry is the best known of the species. It has somewhat spreading branches, good clean foliage and clusters of hawthorn-like flowers in early spring. Its bright-red berries last into the winter.

Privet (*Ligustrum*): Of the many kinds of privets, there is bound to be one which will fit into your landscape somewhere. All of the species can grow in a variety of soils and can stand shade, city and seaside conditions. They all have good clean foliage, spikes of white flowers and black or bluish-black berries that remain on the shrubs most of the winter. On the whole, privets are not hardy, especially the evergreen kinds, and even some deciduous varieties are killed back in severe winters. However, if killed back, they often grow bushier than ever the next season. Some kinds can be closely clipped and trimmed into fancy shapes. The California and *amurense*, or amur, privets are used for that purpose,



A great number of tiny blossoms make up the colorful clusters of the lilac flower

the former being better looking but not as hardy as the latter. The amur privet is a profusely blooming shrub, excellent for masses and hedges. Good for a low hedge, or mass or foundation planting is the regal privet. The European privet has large, glossy fruit and is a good choice for hedges, single shrubs or mass planting.

Quince (*Cydonia*): Grown for fruit, ornament or both, the common quince can be either a wide-spreading shrub or small crooked tree of slow growth. For the best fruit, the young plant should be grown in a deep, heavy, moist, not over-rich soil. The combination of the fruit and flowers makes the quince an excellent ornamental shrub. When planted as such, it should have a circular space of about 15 ft. in diameter in which to grow. A mulch is advised as the plant is rather shallow-rooted. As the quince bears more fruit than it can develop to full size, all defective and crowded ones should be removed when small. For transplanting, one or two-year-old specimens are the best.

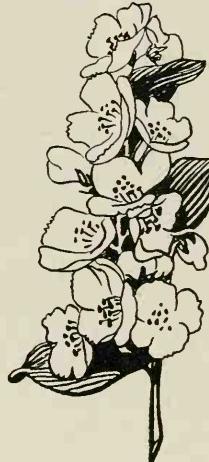
Rose (*Rosa*): Of the three groups of this plant—bedding roses, climbers and shrubs—we will now be concerned with only the last-mentioned. And only the more well-known rose shrubs can be mentioned because of limited space. The rose shrubs are mostly deciduous, with prickly stems and alternate, compound leaves. The flowers grow singly or in clusters and may be any color except blue. A fleshy fruit, the "hip," contains hard, bony seeds enclosed in silky wool. The Ayrshire rose is a climbing sort with large, solitary flowers. The dog rose, a tall shrub with dog-toothed prickles, grows to about 12 ft. and has light pink flowers in clusters. The cabbage rose, growing only to 6 ft., has double pink flowers. The sweetbrier is semiclimbing, with many branchlets and pale pink flowers. Another common kind is Father Hugo's rose, a very tall shrub with pale yellow flowers. The tea rose has ever-blooming flowers which come in shades of white, pink or yellow. The prairie rose, the state flower of Iowa, is a bold, arching shrub with an almost climbing habit. The flowers are bright pink and bloom in midsummer or later. The rugosa rose, averaging 5 ft. high, has single flowers, from white to red in color.

Rose acacia (see Locust).

Shadblow (*Amelanchier*): You may also know this shrub as the shadbush, serviceberry or juneberry. It is the most conspic-

uous of woody plants when its white flowers bloom in the spring before the leaves appear. Although not particular as to soil, the shadblow likes limestone. The downy shadbush is good for specimen or border planting, while the Alleghany serviceberry is suitable for distant borders.

Spicebush (*Benzoin aestivale*): Benjamin-bush, wild all-spice and fever-bush are other names for this shrub. It is a hardy plant which grows in moist places from New England southward. The flowers don't have petals, but the blossoms are numerous enough to be conspicuous in spring before the leaves unfold. The shrub is also colorful in the fall with its yellow leaves and scarlet fruit.

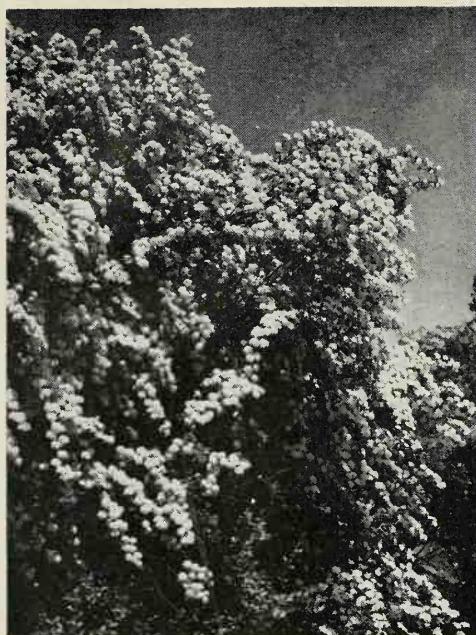


The white or cream-colored blossoms of the mock orange come in early summer

Spiraea (*Spiraea*): Most of the spireas are medium-sized shrubs of good habits and profuse flowers. White is the dominant color of the blossoms. While the earlier-flowering group is all white, the later blossoms are pink or reddish. Spireas prefer a sunny position and any good soil, especially a rich, moist loam. For the cultivated border, the garland, thunberg and bridal-wreath spireas are all good. The arching *vanhouttei* spirea is useful in near-by borders, hedges or mass plantings.

Stephenandra (same botanical name): A graceful shrub well suited for the front of shrub borders or on rocky slopes is the stephenandra. The species called *incisa* grows to 8 ft. and has wide-spreading slender branches with triangular leaves, which become reddish purple in fall. It kills back during severe winters, but grows freely from the base the following season. The species *lanakae* is a more vigorous grower with larger leaves. The cutleaf variety, with its white flowers, is good for use as border facing.

Sumac (*Rhus*): If you want a shrub that can survive under adverse conditions, this is the plant for you. Just stay away from two varieties, the poison ivy and poison sumac. Sumacs have compound leaves, small flowers in clusters and dense fruit heads. They grow in almost any kind of soil, but spread rapidly so should be kept away from shrubbery borders. The fragrant sumac is ideal for the foreground of a mass of shrubbery. The sumac grows under the worst conditions. The staghorn sumac shows to advantage planted among lower-growing species. There are also the smooth sumac with green flowers followed by red fruit, and the shining sumac, which has dark-green, glossy foliage.



The spirea with its profuse flowers is good for single planting. The early blossoms are predominantly white while the later ones are colored pink or reddish

Sweet shrub (*Calycanthus*): Also called sweet-scented shrub, this plant is appropriate in an old-fashioned garden. It grows well in either shade or the open and prefers a rather rich soil that does not get too dry. The Carolina allspice, the hardiest of the species, grows to 6 ft. or more and has dark reddish-brown flowers. It is known as Sweet Betsy in the South. The species *fertilis* is bushier, having leaves 6 in. long and bearing chocolate-purple flowers later in the season. The California allspice is the tallest of the species, with leaves to 8 in. long and light-brown flowers.

Symporicarpos (same botanical name): The clustered fruit is the chief attraction of this shrub, which comes in slender upright forms as well as spreading types. They are not particular about the soil and do well in both sun and shade. The snowberry, or waxberry, one of the species, is a slender shrub with oval leaves and white bell-shaped flowers. It is excellent for shady places and the fruit lasts all winter. The coralberry, or Indian currant, has leaves that stay green until late in the season. The wolfberry is an upright grower with pinkish flowers and white berries.

Viburnum (same botanical name): The flower clusters, commonly called "snowballs," of this shrub are familiar to all. The shrub is among the more useful for general planting purposes. It is a compact and bushy plant with attractive foliage, showy



The viburnum is one of the best known and most widely used of the ornamental shrubs. Its blossoms, referred to as "snowballs," are familiar sights in spring

flowers and decorative fruit. The deciduous kinds are hardy in the North, but only one evergreen variety (*rhytidophyllum*) can survive northern winters. The linden viburnum and European highbrush cranberry are useful in borders. The siebold is good as an accent or in large borders. The doublefile viburnum is also an excellent specimen. Appropriate for naturalistic planting is the arrowwood.

Vitex (same botanical name): Here is another late-flowering shrub, which also comes in both deciduous and evergreen kinds. It will grow in almost any kind of well-drained soil in an open position, although most of the varieties are not hardy in the North. The vitex will grow to about 10 ft. high, the shoots usually being killed back in severe climates. It can be used in the garden or near-by borders.

Weigela (same botanical name): Bell-shaped flowers grow in clusters and bloom intermittently through the summer on this plant. The weigela has a spreading habit with pendulous branches, and it thrives in any good garden soil that does not get too dry. It is generally hardy, but will kill back during a severe winter unless protected. Both the white and old-fashioned weigelas are well placed in borders.

Witchhazel (*Hamamelis*): This shrub has a late blossoming season—late fall to early spring. The flowers have narrow, waxy petals and grow in clusters. The Japanese

witchhazel, averaging 12 ft. high, has winter blossoms that are not affected by zero weather. The common witchhazel does not blossom quite as late as the other variety, but it has flowers and fruit at the same time.

Evergreen Shrubs

Abelia (*same botanical name*): Only two species of the abelia are hardy in the North, and these are best placed in a sunny but sheltered place where the soil is sandy and well drained. The small bell-shaped flowers are produced abundantly and are white, pink or rose in color. The species *engleriana* is hardy as far north as Massachusetts, grows to about 6 ft. and has rosy pink flowers in the summer. *Grandiflora* is a semi-evergreen hybrid, which has pink and white flowers from June to November.

Andromeda (*same botanical name*): This group of shrubs includes varieties for both temperate and cool climates. They are thin in habit, so should be clumped together for the best effect. These shrubs need a moist, peaty soil in partial shade, where their roots are not allowed to dry out.

Azalea (*same botanical name*): This is a kind of rhododendron, but different enough to be treated separately. Most of the common forms are semievergreen, and they are among the most beautiful of flowering shrubs, ranging from 1 to 20 ft. high. The flowers bloom in spring and early summer and come in a variety of colors—pink, red, purple, white, yellow, orange and scarlet. Even when not in bloom, the shrubs have enough foliage and form to brighten the winter landscape. An acid soil and semishade or sunshine are required by the azalea. An oak-leaf mulch is also helpful. The hardiness of the plant depends on the variety, for which you should consult your nursery.

Box or Boxwood (*Buxus*): Also listed with trees, for which see page 79. The *rotundifolia* is one of the hardy shrub varieties which has broadly oval leaves. *Hansworthii* is a good specimen with an upright bushy form and dark-green leaves. The *microphylla* is a compact shrub which

only grows to about 3 ft. The true dwarf box, ranging from 6 to 10 ft. high, is good for a hedge, formal groups or single plantings.

Firethorn (*Pyracantha*): Also known as the firebush, this plant can be used to climb against a wall, for forming hedges or as dense bushes in a shrubbery border. Where hardy, the firethorn will thrive in a sunny position in a well-drained soil. Only the species *coccinea* and its varieties can stand much frost, and they will grow as far north as Massachusetts. They grow to 6 ft. as a bush, or to 20 ft. against a wall.

Holly (*Ilex*): Also listed with trees, for which see page 80. One variety used as a shrub is the dahoone, which grows as high as 25 ft. It has toothed leaves and dull-red berries and is used extensively for hedges in the South. The yaupon, or *cas-sena*, is another shrub variety; it is native from Virginia down to Florida and around to Texas.

Juniper (*Juniperus*): Also listed with trees, for which see page 80. The low, spreading junipers which are good for shrubbery are the *savin* and Japanese species and the va-

riety *depressa* of the common junipers. There are also some creeping junipers, of which the most common are the andorra, sargent, tamarix, creeping and waukegan varieties. These are useful as ground covers in the full sun, to hold steep banks, for rock gardens or an exposed evergreen-border edging.

Kalmia (*same botanical name*): Here is one of the best broad-leaved evergreen shrubs for a northern garden. This shrub has a liking for partial shade and sandy or peaty soils which are not too dry. The mountain laurel, also called calico bush, is probably the best known of the species. The flowers range in color from white to deep rose and have purple markings inside the blossom.

Pachystima (*same botanical name*): A low-growing shrub, this plant is hardy in all but the coldest regions of this country. It thrives in any well-drained soil and is useful for rock gardens and the foreground of evergreen shrub borders or as a border for a garden walk.



The decorative value of a large evergreen shrub is demonstrated above. Low-growing varieties like this one attain maximum size only when planted alone. They also can be planted in borders



The mountain laurel, with its red-dotted white flowers, is among the most valued of broad-leaved evergreens

Rhododendron (*same botanical name*): First in importance among flowering shrubs is the rhododendron. The various varieties range in size from dwarf shrublets to small trees. There are three "musts" where this plant is concerned: (1) an acid soil, (2) semishade and (3) protection against winds. Only the hardiest sorts will grow in New England or north of the Mason-Dixon line in the central states. They are also hard to grow in arid climates. Although rhododendrons are easy to grow in warm, moist regions, they need some special attention. The soil for rhododendrons should have a pH reading between 4.5 and 5.2 and contain enough fibrous material to keep it sufficiently spongy. If half the soil is made up of oak leaf mold, there will be enough acidity, moisture, aeration and drainage. In planting rhododendrons, keep them away from maple trees and avoid a hot, dry spot as well as one in the path of drafts. April is the best time for transplanting, with early fall the second choice. An oak-leaf or peat mulch should be left around the plant throughout the year.

Yew (*Taxus*): Also listed with trees, for which see page 82. Canadian yew, or ground hemlock, is a hardy, low-growing shrub variety which is usually found in dense shade. When grown in the open, it becomes less scraggly but may be discolored by the winter sun. The Japanese yew, the height of which depends on the variety, is useful in accent and foundation planting.

Planting and Selecting Vines

Is there a porch post, trellis, arbor, fence or wall that you would like to dress up in some way? This is where the vines make themselves useful. They also add to the attractiveness of tree trunks by climbing up and around them. Vines also come in handy as cover on steep banks and shady spots where most grasses will not grow. There is also a certain charm in the way they sprawl over rocks.

As there are so many different kinds of vines, no one set of planting instructions can apply for all of them. Some can be grown from seed, especially where annuals are concerned; others should be started from young plants obtained from the nursery. However, certain general suggestions may prove useful.

In preparing the soil, most vines require that the ground be broken up to a depth of at least 2 in. deep and over an area of 3 ft. or more across for each plant. Good garden loam is needed and will have to be imported where it is not naturally available. Enriching the soil by mixing in old manure or leaf mold is recommended for most vines. If the vines are planted close to a building, be sure to remove all rubbish that might obstruct the plant from getting enough moisture and food.

In most cases, spring is the best time of the year for planting vines. To induce good growth of base and roots, cut the tops of the plants back rather severely. The young shoots should be trained at the start to

climb in the desired direction. Stakes and string may be needed at first. Vines placed near a wall are likely to suffer from lack of moisture, so should be well soaked from time to time. After they are established, the vines will also need other things done for them, such as mulching with manure and feeding with a complete fertilizer during active growth.

You can select the appropriate vines for your landscape plan from the list below.

Actinidia (*same botanical name*): For the northern gardener, this vigorous vine is a good choice. Doing well in any good garden soil and in either sun or partial shade, the actinidia adapts itself well to clothe arbors and pergolas, to climb on a wall or to trail up a tree. Growing often to 50 ft., the species *argusa* has large leaves and small clusters of white flowers. The *actinidia chinensis* bears the largest flowers and fruit of the species, but is not reliably hardy. *Kolomitka* is the shortest grower, reaching a height of about 18 ft.

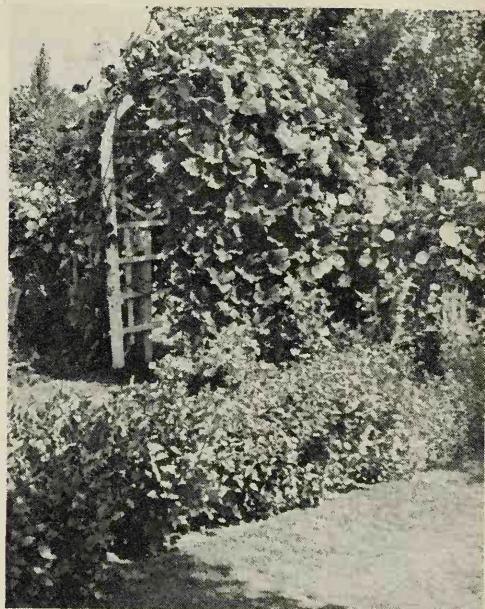
Akebia (*same botanical name*): With a graceful habit, the akebia grows to about 12 ft. in any fairly good soil. It has dark-colored flowers that bloom early in the spring. The vines are easily trained on arbors and pergolas and are useful in clothing stumps and sprawling over rocks.

Ampelopsis (*same botanical name*): Of the 20 or so species of this vine, only a few can be grown in the North. The *ampelopsis* can be used to cover walls, arbors or trellises and to ramble over rocks. The turquoise berry, with its fruit of pale lilac, copper-green or turquoise-blue, is especially good for clothing low walls and sprawling over rocky places. Native to the South is the pepper vine, which has a slender, graceful habit of growth.

Balloon vine (*Cardiospermum halicacabum*): Also known as the heart-seed, this vine is excellent for covering wire fences, growing to 10 ft. with support. The seed pods are inflated like balloons, and each black seed is marked with a white, heart-shaped spot. There are annual and perennial varieties, both of which grow rapidly. The seed can be sown outdoors where the plant is to grow or started indoors and transplanted outside later on.

Birthwort (*Aristolochia*): Some species of birthwort have an unpleasant odor, but only those without this disadvantage are mentioned here. The large leaves of the Dutchman's pipe make this species one of the best for screening purposes. The calico flower, which can grow only in the South, has attractive flowers of purplish brown with white markings. The pelican-flower vine has a peculiar blossom which looks like the body and neck of a bird at rest.

Bittersweet (*Solanum dulcamara*): If



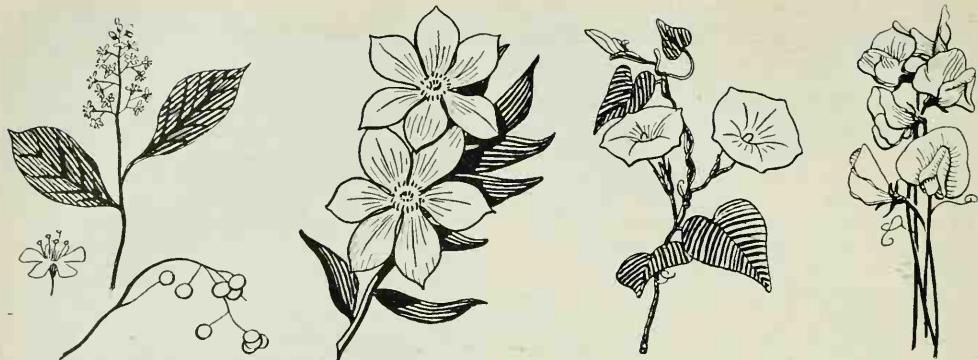
The free and easy way in which morning glories can be trained to grow on an arbor is illustrated above

yours is a wild garden, this climber will fit in nicely. It tends to be shrubby, climbing to about 8 ft. and having violet flowers. Unfortunately the berries are poisonous, so the vine should be planted with discrimination. Most of the species can be grown from seed.

Clematis (*same botanical name*): This vine is fairly well restricted to the more temperate climates of the country, requiring a light loamy soil with lots of lime. There are many different varieties. The woody small-flowered sorts are appropriate on fences, arbors or porches or for rambling in rocky places. The large-flowered hybrids make showy specimens on trellises.

Climbing hydrangea (*Schizophragma hydrangeoides*): Do not confuse this with the hydrangea shrub, which is an altogether different species. The flowers of the vine have only one sepal, while those of the shrub have four. The climbing hydrangea also flowers later in the summer and the leaves are thicker and more coarsely toothed. The vine is slow in getting started, but will eventually get as high as 30 ft. It is good for covering a wall or climbing up tree trunks.

Cobaea scandens (*same botanical name*): This vine is usually grown as an annual, and the best results can be obtained by planting the large flat seeds on edge. In cool climates, cobaea should be started indoors and brought outside only when all danger of frost has passed. The best known



Blossoms of various vines are shown above. From left to right: bittersweet, clematis, morning glory, sweet pea

of the species is the cathedral-bell, or cup-and-saucer vine. It grows rapidly to about 25 ft. and has violet bell-shaped flowers that resemble cathedral bells.

Cymbalaria (same botanical name): This is a creeping perennial vine which is tender in cold climates. Where it will thrive, it does best in moist and partly shaded positions. The Kenilworth ivy is the most popular of the species. This is a shade-loving vine which bears lilac-blue flowers with yellow throats.

Dolichos (same botanical name): The red or white flowers of this plant resemble those of the wisteria, and these are followed by attractive seed pods. The hyacinth bean, one of the species, is a perennial but is grown as an annual, whose seed can be sown as soon as the weather becomes warm in spring. It has reddish-purple flowers and large, three-part leaves. Another species is the Australian pea, which has smaller leaves and rosy purple or white flowers.

Echinocystis (same botanical name): If you want a temporary screen, this vine will do the job. There are perennial and annual varieties, the latter being useful as screens and to drape over fences and arbors. This shrub has deeply lobed leaves, clusters of small white or greenish flowers and egg-shaped fruit.

English ivy (*Hedera helix*): This vine can be used in so many places—to cover walls, rocks, tree trunks and trellises; as a carpet for bare spots in shady places; as an edging for beds and borders. Besides these outside uses, the English ivy makes an excellent house plant, especially for training around a window. There are as many varieties as there are uses. Some have small, greenish flowers. Others have variegated leaves, but these are not very hardy. The English ivy grows as far north as Massachusetts and has the best chance

of surviving the winter in sheltered shady places.

Honeysuckle (*Lonicera*): Climbing honeysuckles are good on trellises and fences or as ground covers. The Japanese honeysuckle, growing to about 15 ft. and having twining stems and white flowers tinged with purple, is an excellent porch vine or cover for steep slopes. The trumpet honeysuckle is a tall climber, which has dark-green leaves and orange-yellow to scarlet flowers. For scrambling over shrubs and small trees, a good choice is the woodbine with its yellowish-white flowers.

Kudzu vine (*Pueraria thunbergiana*): A perennial vine with tuberous roots, this plant will climb from 40 to 60 ft. under favorable conditions. It dies back to the ground during northern winters, but starts up again the following spring. The kudzu vine has large, three-part leaves, spikes of purple flowers and large, flat seed pods.

Madeira vine (*Boussingaultia baselloides*): If this vine of tropical origin will not live through a cold winter, it can be lifted and stored. Also called the mignonette vine, this plant is a rapid grower, enabling it to clothe porches and arbors in short order. The foliage is clean and attractive, and spikes of small white flowers blossom late in the summer.

Morning glory (*Ipomoea*): No list of vines is complete without this plant, an old favorite for covering fences, walls, trellises and so on. The large heart-shaped leaves make an ideal screen, and everyone is familiar with the trumpet-shaped flowers that close at noon. Morning glories are easy to grow in any moderately rich garden soil. The seeds can be sown as soon as all danger of frost has passed, and germination is hastened by piercing small holes in the coat of the seed. Perennial varieties should be started under glass, and in cold regions the roots should be dug and stored

over winter in cold frame or cellar.

Parthenocissus (*same botanical name*): The Virginia creeper, or American ivy, is one species of this vine. It will grow from New England southward. It effectively covers walls, tree trunks and steep banks. Some people mistake it for poison ivy, although its large five-pointed leaves are quite distinctive from the three-pointed poisonous variety. The Boston, or Japanese, ivy is another species. This is a high-climbing, close-clinging vine with glossy three-lobed leaves, which are excellent for covering brick walls.

Staff tree (*Celastrus*): Here is a vine with a beautiful fall effect with its yellow leaves and yellow fruits which open to reveal crimson-coated seeds. This vine can be used to cover walls or trellises, to clamber up an old tree trunk or over rough banks. It thrives in almost any kind of soil and in either sun or shade.

Sweet pea (*Lathyrus odoratus*): There are non-climbing as well as climbing sweet peas, but we will here discuss only the latter. The vines grow to 6 ft. or higher, but always need a trellis, wire or other kind of support upon which to cling.

The sweet-smelling blossoms come in different colors—solid, striped or mottled—and may be plain-petaled, wavy-petaled or ruffled. This vine requires a rich, deeply worked soil, one which is clayey but well drained. Sunny locations are also recommended. In planting the sweet-pea vine, prepare the ground as late in the fall as possible, working in plenty of humus. The seeds should be sown early in the spring in furrows about 3 or 4 in. deep and covered with no more than 2 in. of soil. The supports can be put in when the plants are 2 in. high. Trellises with heavy string running up and down from nail to nail provide an excellent support. The seeds should be planted on each side of such a trellis, not closer than 1 in. apart and better at 3-in. intervals. The sweet peas may have to be

thinned out later so that the roots have enough room. The plants must also be closely picked and never allowed to get dry. This means letting the water soak to a depth of 8 or 10 in., and maintaining a loose surface mulch during the growing season.

Trumpet creeper (*Campsis*): This vine is usually grown as a climber or allowed to ramble over rocky places. As climbers, they do best on posts and old tree trunks. It is not a good vine against wooden buildings, because it grows so vigorously that it loosens shingles. Cut back the long lateral shoots to about two stem joints before growth begins. The native species is the hardest and can be grown as far north as New England, climbing to about 30 ft. and bearing orange-red tubular flowers in late summer. It often spreads so rapidly as to become a troublesome weed if not controlled.

Wisteria (*same botanical name*): Here is one of the best of ornamental vines for temperate regions, where it often lives to an old age and attains considerable size. A deep rich loam, not too dry, is the best kind of soil for the wisteria. The vine is most picturesque when allowed to



Shown above are the leaves of the various species of the English ivy, variegated as well as solid-colored

U.S.D.A.

grow freely up an old tree. As the roots are long but not fibrous, the plants should be started inside in pots or flats and transplanted to the garden in spring. Since some varieties may not flower, plant a specimen which has been grafted or layered from flowering kinds. The Chinese wisteria is a vigorous grower, sometimes attaining an amazing height of 100 ft. in mild climates. Its flowers are violet-blue and grow in clusters. The Japanese wisteria is a hardier species and has smaller and more fragrant flowers. Another hardy sort is the silky wisteria, which grows to 30 ft. and has white flowers and velvety pods.

One drawback to the wisteria is its attraction for insects. They should be sprayed with a nicotine and soap solution to ward off the bugs.

Flowers add color to the home grounds

WHEN IT COMES to beautifying and brightening your home landscape with a variety of colors, you can let the flowers take over. There is no other way to obtain such quick and inexpensive effects. Moreover, growing flowers is so easy that even the amateur will have success if he spends a little time in the garden and provides congenial growing conditions.

Plan Your Garden First

Before you get out your gardening tools to prepare the ground for planting, give some careful thought to the layout of the flower borders. This is especially important where perennials are concerned, for these plants must remain in the same place year after year. Annuals, of course, can be arranged differently each year.

You will want the color and form of the various flowers to harmonize with each other as well as with other kinds of plants. It is also a good idea to plant flowers so that you will have a long season of blossoms—a succession of flowers in bloom rather than a simultaneous outburst lasting but a few weeks.

Planting Annuals

Annuals are plants which complete a growing cycle in a single season, but have to be started from seed each year. They are convenient and easy to plant, supplying color when shrubs, trees and perennial flowers are out of season. Annuals are also useful to grow where only a temporary effect is desired, as on rented property where a tenant may not want to go to the expense of more permanent plantings.

Soil preparation: The ideal soil for most annuals is a light loam with a dressing of 2 in. of manure, peat or leaf mold incorporated in the soil. There are many annuals which are partial to lime soil. So if the soil

reaction is highly acid, add about 5 to 10 lbs. of ground limestone to every 100 sq. ft. of area. This treatment should be given at least once every two or three years. For acid-loving and alkaline-loving flowers, see the charts on page 27.

Sowing seed outdoors: The seeds of most annuals can be sown outdoors where they are to grow. The more tender ones may have to be started indoors in seedbeds, or in hotbeds or cold frames, depending on the climatic conditions and how early in the season you want flowers on the home grounds. Whether the seeds should be sown indoors or outdoors depends on the temperature at which seed germination will take place. This differs from plant to plant, varying from 40 to 90 deg. Fahrenheit. A soil temperature of 65 to 70 deg. Fahrenheit is satisfactory for most seeds. Fortunately, nature provides these conditions early in the growing season. When you purchase flower seeds, allow for about 60 percent germination as a maximum. You may sow the seeds either broadcast or in rows. Planting the seed in rows is the best way for the inexperienced gardener, as weeds can be more easily distinguished and removed. The rule for covering seed planted outdoors is to bury them three to five times their diameter. Seeds about the size of grains of wheat are usually planted 1 in. deep, and for those the size of beans, 2 in. deep. Very small seeds can be merely scattered over the surface and tamped down into the soil. No matter what the size of the seeds, they should have the soil well compacted around them. The chart on page 100 may be used as a guide for planting annuals.

Starting annuals under glass: Where higher temperatures are needed for germination of seeds, a sunny kitchen, hotbed, cold frame or greenhouse must be used. When you sow seeds in flats, place them in

① Steps in preparing the soil



rows rather than broadcasting to make the transplanting easier later on. Sow the seeds thinly so that the plants will not be crowded when they come up. If you sow twice as many seeds as you want plants, this should allow for failures from accidents or other causes. If all seeds grow, thin out the plants of poorer quality. The rule for covering seeds planted under artificial conditions is to bury the seed to the depth of its greatest diameter. Be sure that the soil is well compacted around the seeds, for the soil is the only medium through which the seeds receive the heat and moisture needed for germination. The amount of moisture in the seedbed should be controlled so that there is neither too much nor too little.

The plant is ready to be set outdoors as soon as the first true leaves appear and the weather is warm enough. Once the plant has reached garden size, the sooner it is transplanted the quicker it will recover and resume growth. Therefore, schedule your sowing so that the plants will not outgrow their indoor quarters before it is warm enough to move them outdoors. A general guide is to start the seed in a cold frame or in the house four weeks before the weather permits outdoor planting, six weeks earlier in a hotbed and eight weeks or more in a greenhouse.

Transplanting: If you feed the seedlings a week before they are to be transplanted, you will get excellent results. The plant food can be prepared by placing a cloth bag containing 4 oz. of 4-11-4 fertilizer in a gallon of water. A special soluble plant food can also be made according to the manufacturer's directions. Before the seedlings are transplanted outdoors, soak the seedbed with water thoroughly for about an hour so that the plants can be removed from the soil without breaking the roots. The border in which the plants are to be set should be prepared as shown in Fig. 1. You can make satisfactory holes in which to place the plants with a short stick $\frac{3}{8}$ to $\frac{1}{2}$

in. in diameter and sharpened at one end. For digging the seedlings a flat stick sharpened at one end or a pencil (Figs. 4 and 5) will be of help. Loosen the seedlings carefully so that they may be lifted out with any soil that may adhere to the roots. Then place the plants in new holes at about the same depth as they were before, and firm the soil around the roots.

Water the plants thoroughly and carefully immediately after planting and keep them shaded until the roots are well established again. The plant-food solution mentioned above should again be applied around the plant roots. This solution not only supplies the plant with nutrients but also puddles the soil about the roots to make it easy for the plant to take up water. The amount of shading needed by the plant will depend on the weather. Longer shading is required in hot, dry weather than in cool, partially cloudy weather. The space required about each plant is determined by its eventual size.

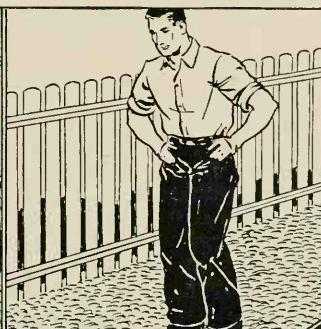
Establishing Perennials

Once you get a perennial border established, you will have an abundance of flowers year after year. You must, of course, keep the soil cultivated and enriched, prevent the plants from becoming too thick and crowded, guard the perennials against attacks by disease and insects and provide proper winter protection. Spring-blooming perennials have to be started the summer before, the summer-blooming kinds the autumn before and the fall-blooming ones in the greenhouse or hotbed in winter or cold frame in spring. You may also sow seed in June or July to produce seedlings of sufficient size for potting in the fall. These can be carried through the winter in protected frames.

Soil for perennials: Soil preparation for perennials is essentially the same as for annuals, except that it should be more thorough, as the plants are to remain in the



ADD BONEMEAL, 10 LBS., AND A 2-IN.
LAYER OF MANURE PER 100 SQ. FT.



SOIL CAN BE PACKED DOWN FIRMLY
BY WALKING ON IT



THEN LEVEL UP THE BED BY A LIGHT
RAKING PRIOR TO PLANTING

same spot for a number of years. This means cultivating the soil deeper. An occasional application of lime is helpful to most perennials, although some of them prefer acid soil.

To assure proper physical condition of the soil, the winter mulch of manure, leaves or peat should be worked into the soil each spring. In preparing a new bed for perennials, apply complete fertilizer in dry form and mix well into the soil. About 4 lbs. of 4-12-4 mixture for every 100 sq. ft. of area may be applied before planting. This is about 1 rounded tablespoon per sq. ft. After the ground has been spaded, worked to fine particles and enriched by plant food, firm the soil by walking on it. Then level the ground by raking it lightly, using the rake to break up any remaining clods.

When the buds appear, give a second feeding at half the rate used before planting. Plant food should be added to the soil during the first half of the growing season. Late-summer and fall applications are discouraged, as this encourages succulent growth and leaves the plants in an immature condition for winter. Established perennial borders can be enriched with plant food early in the spring in the same way as for new beds. This should be done before the plants sprout and again after the buds appear. Scatter the plant food evenly and keep it away from new shoots.

Nursery perennials: For the quickest effects and most certain results, start a perennial border from plants, preferably field-grown ones. This is an expensive way to establish a perennial border, but you will have flowers in bloom from the first season.

When you transplant these nursery plants, under no circumstances prune their roots. If any roots are lost, they have to be replaced before the plant will grow. Pruning the tops is also not advised, as growth depends on that part of the plant. Wholly dead leaves may, however, be picked off, although it would do no harm to leave them.

Starting perennials from seed: The home gardener who wishes to be adventurous can

| Partial list of annuals and their requirements | | Soil | | Likes | Sow | 2 | | Used for | | Germination days | | | |
|--|-----------------------|----------------------------|----------|----------|------------|------------|---------|-------------|--------|------------------|---------|--------|-------|
| Catalog name | Common name | Rich, humic Good garden | Ordinary | Full sun | Part shade | Transplant | In situ | Space apart | Height | Border | Rockery | Edging | Hardy |
| Acroclinium | Everlasting | x | x | x | | x | x | 10 | 15 | 7.9 | x | | 10 |
| Ageratum | Floss Flower | x | x | x | x | x | | 6-10 | 6-20 | 6-11 | x | x | 5 |
| Alyssum 1 | Sweet Alyssum | x | x | x | x | x | x | 8 | 8 | 5.9 | x | x | 5 |
| Anagallis | Pimpernel | x | x | x | x | x | x | 8 | 10 | 6.9 | x | x | 10 |
| Arctotis | African Daisy | x | x | x | x | x | x | 6-18 | 6-36 | 6-10 | x | x | 8 |
| Aster | China Aster | x | x | x | x | x | x | 12-18 | 12-36 | x | | | 10 |
| Browallia | Amethyst | x | x | x | x | x | x | 6-10 | 12-18 | 5-10 | x | x | 10 |
| Calendula 2 | Pat Marigold | x | x | x | x | x | x | 12 | 12 | 6-10 | x | x | 10 |
| Collomia | Collomia | x | x | x | x | x | x | 8-12 | 9-36 | 6-10 | x | x | 8 |
| Chrysanthemum 2 | Annual 'Mums' | x | x | x | x | x | x | 12-18 | 24-36 | 6-10 | x | | 8 |
| Cosmos | Cosmos | x | x | x | x | x | x | 24-30 | 48-72 | 7-10 | x | | 8 |
| Dianthus | Pinks | x | x | x | x | x | x | 12 | 12-18 | 7-10 | x | x | 8 |
| Delphinium | Larkspur | x | x | x | x | x | x | 12 | 24-30 | 7-8 | x | | 15 |
| Euphorbia 3 | Snow-on-mountain | x | x | x | x | x | x | 12-24 | 30-48 | x | | | 15 |
| Goillardia | Blanket Flower | x | x | x | x | x | x | 12 | 12-18 | 6-11 | x | | 20 |
| Helichrysum | Strawflower | x | x | x | x | x | x | 15-18 | 24-36 | 8-9 | x | | 5 |
| Morvel-of-Peru | Four o'Clock | x | x | x | x | x | x | 24 | 24 | 7-10 | x | | 5 |
| Marigold | Marigold | x | x | x | x | x | x | 12-24 | 8-36 | 7-10 | x | x | 5 |
| Nostrantium 1 | Nostrantium 3 | x | x | x | x | x | x | 10 | 8-12 | 6-10 | x | x | 10 |
| Pansy 2 | Pansy | x | x | x | x | x | x | 8 | 8 | ** | x | x | 10 |
| Petunia | Petunia | x | x | x | x | x | x | 12 | 12 | 6-10 | x | x | 10 |
| Phlox 1 | P. Drummondii | x | x | x | x | x | x | 10 | 15 | 6-9 | x | x | 10 |
| Portulaca 3 | Rose Moss | x | x | x | x | x | x | 8 | 6 | 6-10 | x | x | 10 |
| Rudbeckia | Black-eyed Susan | x | x | x | x | x | x | 15 | 24 | 8-10 | x | | 20 |
| Salvia | Sage | x | x | x | x | x | x | 12-18 | 24-36 | 8-10 | x | | 15 |
| Salpiglossis | Painted Tongue | x | x | x | x | x | x | 12 | 30 | 7-9 | x | | 15 |
| Scabiosa | Pincushion Flower | x | x | x | x | x | x | 12 | 24-36 | 7-10 | x | | 10 |
| Snapdragon | Snaps | x | x | x | x | x | x | 10-18 | 10-36 | 7-10 | x | x | 10 |
| Venidium | Monarch of the Valley | x | x | x | x | x | x | 15 | 30 | 8-10 | x | | 10 |
| Verbena 3 | Verbena | x | x | x | x | x | x | 8-12 | 12-15 | 6-10 | x | x | 8 |
| Xeranthemum | Immortelle | x | x | x | x | x | x | 10 | 24 | 7-10 | x | | 10 |
| Zinnia | Zinnia | x | x | x | x | x | x | 10-24 | 12-24 | 6-10 | x | x | 5 |

1 Likes lime added to soil. 2 At their best in cool climates where summers are not long and hot. 3 Use no manure; avoid rich soil. Annual Asters have three blooming seasons: some varieties flower in late spring; others in mid-season, and still others mid-season until frost. * Flowers are of no value, and is usually grown for its rich foliage. ** Blooms to perfection in cool spring or fall, but is fickle in hot weather. For spring flowers, sow in mid-August and winter over. Sow in June for fall flowers.

start his perennials from seed. It is less expensive to use this method, but you will have to wait at least a year before you have blossoms. And the results are not as certain when you sow seed.

To start perennials from seed, sow them in flower pots or cans, seed flats, cold frames or frames specially made for the purpose. Most perennials germinate when the temperature is about 45 to 50 deg. Fahrenheit. So the sowing is best done just before light frosts have ceased. The slower-germinating seeds should be started in cans, flower pots or seed flats indoors several weeks before frame sowing. If cans are used, these can be sunk into the soil in the frame as soon as germination starts.

If you are planting small seeds, mix them with equal parts of peat moss and sand. Then sow this mixture directly on some moss in a flower pot. If a pane of glass is placed over the pot, enough moisture will be maintained for quick germination. Water the pot from beneath by placing it in a pan of water.

Larger seeds can also be mixed with sand, peat moss and loam, although this mixture can be coarser. After the seeds are sown, cover them with a mixture of three-

3 Partial list of good perennials and their requirements

| Genus | Common Name | Soil | | Likes | | Set in | | Space apart | | Used for | | | Color | Seeds germinate (days) | Blooms (months) | One of several good varieties | |
|---|-----------------------|-------------|-------------|-------------|-----|------------|--------|-------------|--------|----------|-----------|--------|-----------|------------------------|-----------------|-------------------------------|------------------|
| | | Rich, humic | Good garden | Light sandy | Sun | Part shade | Spring | Fall | Height | Border | Rock work | Edging | Carpeting | | | | |
| Achillea 1 and 2 | Yarrow-d | X | X | X | X | X | 10 | 24 | X | | | | | white 4 | 10 | 6-11 | Ptarmica |
| Alyssum | Madwort-d, c | X | X | X | X | X | 8 | 12 | X | X | X | | | yel. 4 | 7 | 4-5 | Saxatile Camp. |
| Anchusa | Bugloss-d | X | | X | X | X | 18 | 48 | X | | | | | blue | 12 | 7-8 | Dropmore |
| Aquilegia | Columbine-d | X | X | X | X | X | 12 | 36 | X | | | | | various | 30 | 5-7 | Dreer's L. S. |
| Armeria | Thrift-d | | | X | X | X | 8 | 18 | X | X | X | | | various | 10 | 6-8 | Farmosa G. F. |
| Centaurea 1 | Carnation-d, c | X | X | X | - | X | 10 | 24 | X | | | | | blue 4 | 5 | 7-8 | Montana |
| Chrysanthemum maximum 3 | Shasta | | | | | | | | | | | | | white | 7 | 6-8 | Alaska |
| | Daisy-d, c | X | X | | X | X | 12 | 36 | X | | | | | yel. | 5 | 6-8 | Dbl. Sunburst |
| Coreopsis | Tickseed-d | | X | X | X | X | 12 | 30 | X | | | | | | | | |
| Delphinium 5 | H. Larkspur-d, c | X | | X | X | X | 24 | 60 | X | | | | | lilac 4 | 21 | 6 | Lancelot |
| Dianthus 5 | H. Pinks-d, c | X | X | X | X | X | 8 | 18 | X | X | X | | | mixed 4 | 8 | 6-8 | Plumarious Semp. |
| Erigeron 1 | Fleabane-d | | X | X | X | X | 12 | 30 | X | X | | | | blue | 15 | 6-8 | Speciosus |
| Gaillardia 6 | Blanket Flower-d, c | X | X | | X | X | 12 | 30 | X | | | | | various | 21 | 6-11 | All are fine |
| Gypsophila 5 | Baby's Breath-d, c | | X | X | X | X | 24 | 36 | X | X | | | | white 4 | 10 | 8-9 | Paniculata |
| Geum 6 | Avens | X | | X | X | | 8 | 18 | X | | | | | red 4 | 10 | 6-9 | Mrs. Bradshaw |
| Helianthus 3 | Hardy Sunflower-d, c | X | X | X | X | | 12 | 48 | X | | | | | yel. | 5 | 9-10 | Cucumerifolius |
| Heliopsis 1 | Hardy Zinnia | X | X | | X | X | 12 | 40 | X | | | | | yel. | 10 | 7-9 | Pitcheriana |
| Heuchera 1 | Corallbells-d, c | X | | X | X | X | 8 | 24 | X | X | | | | red 4 | 21 | 6-9 | Sanguinea |
| Lavandula | Lavender-d | X | X | X | X | | 10 | 18 | X | X | | | | blue | 10 | 7-8 | Vera |
| Liatris | Gay-feather-d | X | X | X | X | X | 12 | 48 | X | | | | | purp. 4 | 21 | 7-8 | Pycnostachya |
| Linum | Flax-d | X | X | X | X | X | 8 | 24 | X | X | | | | blue 4 | 10 | 6-7 | Perenne |
| Lychnis 1 | Campion-d, c | X | X | X | X | X | 18 | 30 | X | X | | | | red 4 | 10 | 7-9 | Chalcedonica |
| Matricaria | Feverfew-d | X | X | X | X | X | 12 | 18 | X | X | | | | white 4 | 10 | 6-9 | Dbl. White Imp. |
| Nepeta | Catmint-d | X | X | X | X | X | 8 | 12 | X | X | | | | lav. | 10 | 5-8 | Mussini |
| Pentstemon-d | Beard Tongue | X | X | | X | X | 10 | 30 | X | | | | | blue | 10 | 6-10 | Grandiflora |
| Physostegia 3 | False Dragonhead-d, c | X | X | X | X | X | 12 | 36 | X | | | | | pink 4 | 15 | 7-8 | Virginia |
| Platycodon 7 | Bellflower-d | X | X | X | X | X | 8 | 18 | X | X | | | | blue 4 | 21 | 7-9 | Mariesii |
| Pyrethrum 1-8 | Painted Daisy-d | X | | | X | X | 15 | 24 | X | X | | | | red 4 | 21 | 5-6 | Roseum J. K. |
| Rudbeckia 1 | Caneflower-d | X | X | X | X | X | 15 | 36 | X | | | | | purp. 4 | 21 | 6-8 | Purpurea |
| Salvia 1 | Blue Sage-d, c | X | X | X | X | X | 10 | 40 | X | | | | | blue 4 | 15 | 8-9 | Azorea |
| Scabiosa | Pincushion Flower-d | | X | X | X | X | 8 | 24 | X | | | | | lav. 4 | 10 | 6-8 | Caucasica l. H. |
| Sedum | Stonecrop-d, c | X | X | X | X | X | | | | X | X | | | | | | |
| Sidalcea | Greek-mallow | X | X | X | X | X | 8 | 36 | X | | | | | mixed | 15 | 7-8 | Stork's Hybrids |
| Stokesia | Stokes' Aster-d | X | X | X | X | X | 8 | 24 | X | | | | | blue 4 | 21 | 8-10 | Cyanea |
| Tunica | Coot Flower-d | X | X | X | X | X | 6 | 6 | X | X | | | | pink | 5 | 6-9 | Saxifraga |
| Verbena 6 | Verbena | X | X | X | X | X | 6 | 12 | X | X | | | | blue 4 | 10 | 6-10 | Venosa |
| Veronica | Speedwell-d | X | X | X | X | X | 8 | 24 | X | X | | | | blue 4 | 15 | 7-8 | Longifolia |
| Valeriana-d | G. Heliotrope | X | X | X | X | X | 12 | 24 | X | | | | | red 4 | 15 | 6-9 | Coccinea |
| Viola-d | Tufted Pansy | X | X | | X | X | 8 | 10 | X | X | | | | blue 4 | 48 | 5-9 | Jersey Gem. |
| Perennials to be had by division | | | | | | | | | | | | | | | | | |
| Acanthus 7-B | Monkshood | X | X | | X | X | 8 | 30 | X | | | | | blue | 9-10 | Fischeri | |
| Anemone 6-8 | Windflower | X | X | X | X | X | 10 | 30 | X | | | | | white 4 | 9-11 | Japanica | |
| Aster * | Starwort 3 | X | X | X | X | X | 12 | 40 | X | | | | | white 4 | fall | Mt. Everest | |
| Aster Hybrids 3 | | X | X | X | X | X | 12 | 15 | X | X | | | | blue 4 | 6-10 | Frikartii | |
| Campanula * | Bellflower | X | X | | X | X | 10 | 30 | X | X | | | | blue 4 | 6-7 | Persicifolia Telham Beauty | |
| Chrysanthemum | Gorden var. ** 3 | X | | X | X | X | 18 | X | | | | | | various | fall | All are excellent | |
| Chrysanthemum | Korean 3 | X | | X | X | X | 18 | X | | | | | | various | fall | All are excellent | |
| Geranium | Crane's-bill 7 | X | X | X | X | X | 12 | 18 | X | X | | | | red 4 | 7-8 | Sanguineum | |
| Phlox Decussata | Hardy Phlox 1 | X | X | | X | X | 12 | 24 | X | X | | | | pink 4 | long | Columbia | |
| Potentilla | Cinquefoil 1 | | X | X | X | X | 12 | 18 | X | X | | | | or'ng. 4 | 6-9 | Lady Rolleston | |

Symbols and abbreviations:

1. Dig, divide and replant every third year
2. Cut back shoots after flowering
3. Dig, divide and replant every second year
4. Indicates that varieties may be had in other colors
5. Likes lime in soil
6. Protect in winter with dry straw

7. After planting, do not disturb
8. Needs plenty of moisture
- (d) Propagate by division
- (c) Propagate by cutting
- * Indicates plants will come from seed
- ** Range in height from dwarf to 4 ft.

fourths peat and one-fourth loam. Then water with a fine spray. Where larger amounts of seed are to be sown, seed flats are more convenient to use. A flat 12 x 8 in. and 3 to 4 in. deep is a good size. Be sure that drainage is provided by leaving spaces between the bottom boards. The seed is best sown in rows about 1 to 2 in. apart. As soon as the seedlings develop true leaves, transplant them to a nursery row to give them more room to grow.

You can also sow perennial seeds directly in the soil in permanent cold frames or frames constructed for this purpose. These special frames can be built wherever there is suitable soil. Construct the frame with 12-in. boards to whatever dimensions are needed. A width of 4 ft. is recommended, while the length will depend on the amount of seed to be sown. Fill in the frame with sifted topsoil to raise the level of the bed a few inches higher than the surrounding area. This will insure good drainage. The seed can then be sown in rows, each of them being labeled. Use porous soil, peat moss or sand to cover the soil, and keep the surface moist until the seeds sprout. Provide a lath canopy to protect the seedbed from sunlight. If regular cold frames are used, the glass should be covered with burlap or whitewashed. The sash should be raised a little during sunny days. Most varieties will be large enough by fall to be placed in their permanent beds. If moved by Oct. 1, they will become established and will flower the following year.

Perennials from cuttings and roots: Sometimes it becomes necessary to raise perennial plants from cuttings and root divisions. This is because the seed reproduced by some flowers will not flower true to the color, size and growing habits of the

parent plant. But cuttings and roots are never affected in this way.

To make cuttings from which to start new plants, cut the shoots from sturdy plants which have finished blooming. Where certain plants are concerned, like the iberis or arabis, cut the shoot to include a piece of the old stem, which will result in a mallet-shaped cutting. Other cuttings are made with a heel, which is a small oval piece of the covering of the old stem about a half inch long. Make all cuttings with a straight knife and avoid tearing or pulling the new shoot away from the old stem. Cut small, creeping plants eight to 10 joints long and bury two-thirds of it in the soil. The shoots should not be too long, as weak, leggy plants would result. Softwood cuttings should be about 3 to 6 in. long. Remove half the leaves and all flower buds from the cutting, but be careful not to tear them off. Hardwood cuttings should be a little longer—about 8 in. Make these cuttings when the plant is dormant, but not during freezing weather. The wood should be a year old, firm, plump, thick, free of leaves and with two or more eyes, or nodes. One of the eyes should be at the top of each cutting.

Most cuttings seem to take root best in a slightly acid soil, so an application of a weak solution of vinegar to the soil may be helpful. About a teaspoonful of vinegar to a gallon of water is the correct proportion. Plant the cuttings in a seedbox about 2 in. apart each way, label and water. The box should be shaded with a piece of paper or cloth over the glass top and kept this way for 10 days. It can be opened for light and fine-spray sprinklings only if the top of the sand starts to dry out. When the 10-day period is up, raise the glass during the mornings, but maintain the shade and keep the soil moist at all times. If any signs of damping-off or fungus appear, apply a solution of 3 tablespoons of formalin to $\frac{1}{2}$ gal. of water. As soon as the plants begin to grow, remove the glass but maintain the shade until the root system is well established. The small plants can then be transplanted to their permanent position. A soil consisting of two parts of finely sifted loam to one part of rotted leaf mold is ideal for growing cuttings. After transplanting, the plants should be shaded for a day or two and semishaded with a slatted covering until they can stand full sunlight. Keep the soil well watered and loosened on top. After three or four new leaves have developed, apply a weak chemical fertilizer—one tablespoon to a gallon of water—to the plants. This treatment should not be given later than August, as new growth should not be encouraged as cold weather approaches.

When your perennial border gets well es-

FIG. 4

When seedlings begin to crowd, transplant them. A pencil makes a good pry to loosen the plant for lifting

Ferry Morse Seed Co.



tablished after a few days, some varieties of plants have to be dug up and their roots divided to relieve the crowded conditions. From this operation come the root divisions, which can be planted in another spot to start a new plant. Plants that finish blooming by late summer can be dug and divided in the fall. Perennials that continue to bloom into the fall months are divided in the spring. In digging up the plants, be sure that the roots are well protected with wet newspaper. It may be necessary to add plant food to the soil before the old roots are reset and the new ones transplanted. Don't put back all the divisions in the same spot, but spread them around with their habit of growth to serve as a guide.

Layering: This is another process by which perennials can be started. This involves rooting a branch without detaching it from the parent. First, notch a branch and hold it open by a small pebble or by bending the stem. Then staple it to the ground with bent pieces of heavy wire and cover this well with soil. Keep the soil well watered, and sever the branch from the main plant when it is well rooted.

Mulching: This is an important step to both annuals and perennials, although it is to be practiced at different times for the two types of plants. The correct time to mulch is right after planting. A peat mulch is recommended, as it furnishes nitrogen as well as keeping the soil cool. Some annuals prefer high temperatures and require no mulch.

Mulch is applied to perennials to keep them from being winter-killed. Peat can be used between the plants, but clean straw, hay, excelsior or other coarse material is recommended for use over the plants. A 2-in. depth of mulch is sufficient. Wait until the soil has been hardened by freezing before applying the mulch, as the purpose is to keep the plants cold and frozen as much as possible to prevent heaving by alternate freezing and thawing. Remove the mulch as early as possible in the spring, gradually if the sun is hot or all at once if the weather is cool and cloudy. Allow no shoots to come up under the mulch.

Growing Bulbous Plants

In a class by themselves are flowers grown from bulbs. As a matter of fact, gardening with bulbs is an art all in itself. Beautiful effects can be obtained from bulbous plants, which can be grown in numerous sites. On the whole, bulbs are harder than seeds and are much better equipped to withstand the accidents that prevent germination or destroy infant plants. But bulbs do require certain growing conditions to assure their success. The first and obvious step is to obtain large,

fully developed bulbs from a reliable dealer.

Soil for bulbs: A silt or a sandy loam is the best kind of soil for most bulbous plants. And this soil must be well drained. The culture of bulbs should never be attempted in soil where the water does not drain away readily to a depth of 20 to 24 in. Good drainage is absolutely necessary because the bulbs decay in wet soil. If you have any doubt as to the drainage of your soil, raise the bed 6 in. or more above the surface before planting. Putting the ground in good physical condition to a depth of 2 ft. and placing a 3-in. layer of cinders under the flower bed should assure proper drainage.

To put the soil in good physical condition for bulb planting, a number of materials can be used. One good treatment is to work into the soil one large handful of coarse raw bone meal, one of steamed bone and two of wood ashes to each square yard of planting surface. All of these materials should be mixed deeply and thoroughly into the soil. An application of superphosphate and potash is also helpful just before planting in the fall. Well-decomposed manure can also be mixed thoroughly in the soil before planting. Under no circumstances should fresh manure be used. This material will ferment in the soil and eventually cause the bulbs to decay.

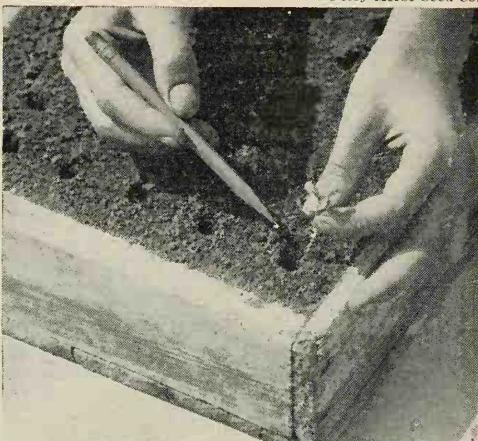
If you get the soil in good condition with a sufficient amount of humus, commercial fertilizer will not have to be used until the second season of bulb development. The application is best made in spring, and a 4-12-4 fertilizer at the rate of 2 lbs. per 100 sq. ft. is recommended.

Planting bulbs: Most bulbs should be planted in the fall as soon as they arrive from the dealer. These are the hardy bulbs which can be left in the ground during the

FIG. 5

With the aid of a pencil again, lower the plant into a new hole for transplanting and cover the roots well

Ferry Morse Seed Co.



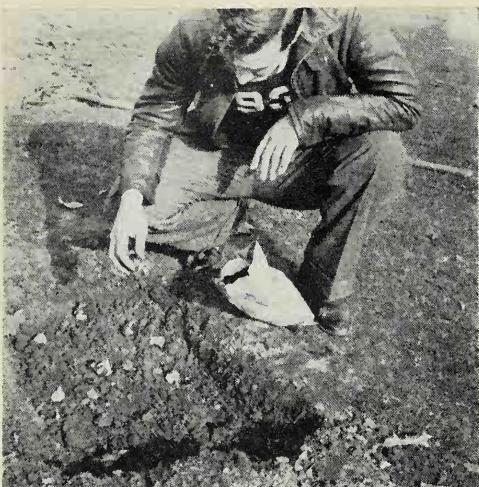


FIG. 6

National Garden Bureau

One way to plant bulbs: remove the topsail from the entire bed, set bulbs in place and shovel the soil back

winter. The greater proportion of these are available in October and are best planted that month. The larger sorts can be planted up to Christmas. The summer-flowering bulbs, which are less hardy, should be planted the same year and be dug up before winter. This group of bulbs will be discussed more fully later on.

There are two general methods of planting bulbs. One way is to dig a hole with a trowel for each bulb to be planted. In using this method, the important thing to remember is not to leave any air pockets underneath the bulbs, as this will cause rotting. Packing the soil firmly around the bulb is absolutely essential, as this is the only way they can get food and moisture. The second method is especially good for a formal garden or a large bed. This involves removing the topsoil from the entire bed to the correct depth for planting, setting the bulbs in

place and shoveling the soil back (see Fig. 6). This method can be used only where there are no perennials and is usually more laborious than necessary for home planting.

It is important that bulbs be planted deep enough so that the alternate freezing and thawing of winter, which expands and contracts the soil, will not squeeze the bulbs out of the earth. Each type of bulb has a so-called optimum depth at which it should be planted. In general, plant bulbs two or three times their greatest diameter beneath the surface. This rule does not always apply, for in some cases it is better to plant even deeper. Also, if the soil is light and sandy, bulbs may be planted deeper than if the soil is heavy clay. The chart in Fig. 7 may prove useful as a guide for planting bulbs.

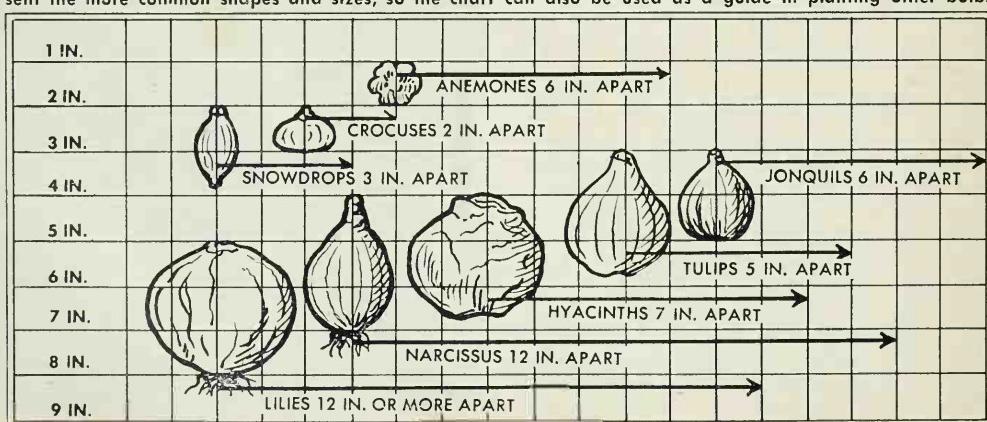
If you suspect that moles or mice will disturb your bulbs, plant them in wire baskets. You can make these baskets from hardware cloth with $\frac{1}{4}$ -in. mesh. Merely bend and fold a piece of the wire cloth into a basket shape about 6 to 8 in. deep and 5 to 6 in. wide. The bulbs are planted inside these baskets. If moles and mice are extremely troublesome, you may have to line the entire bed with hardware cloth.

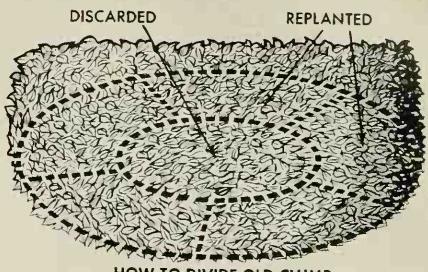
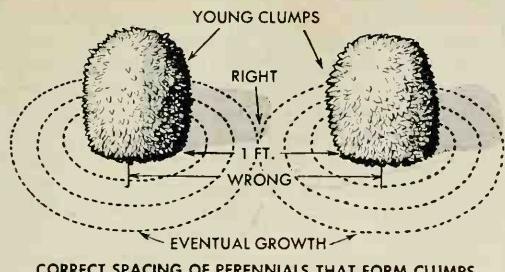
After-planting care: Wait until the ground has frozen, then mulch the area over the bulbs. A 4 to 6-in. layer of leaves, straw or like material will protect the bulbs from the destructive freezing and thawing. Coverings of this sort are necessary only in freezing climates. Examine the mulch the first thing in the spring to see that it is light and dry, but leave it in place until all danger of frost has passed. Take the mulch off carefully before the sprouts extend over an inch or so.

Just as the buds are forming, apply two weak dressings of liquid manure, which will increase flower size. If liquid manure is not available, a tablespoon of nitrate of

FIG. 7

The chart below shows the depth and interval at which to plant certain bulbs. The bulbs on the chart represent the more common shapes and sizes, so the chart can also be used as a guide in planting other bulbs





soda or chemical plant food in a gallon of water may be substituted. Wash the solution into the soil by a good watering.

Continual light cultivation during the season of growth should be practiced until the last bit of foliage has died.

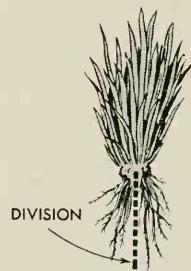
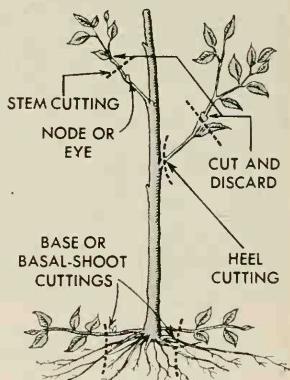
During the first few seasons after plantings, the bulbs can be allowed to grow without disturbing them. But after a few years, when the foliage increases considerably and the flowers decrease in number, it is time to dig up the bulbs and divide them. When you lift the bulbs, be sure that foliage is fully yellow. To separate the bulbs, merely pull apart those that hang loose. You can either replant the bulbs immediately in another location or store them over the summer and replant in the fall.

Spring bulbs: This group of flowers, which blossoms in the summer, is in actuality made up of corms, tubers or rhizomes rather than true bulbs. Spring bulbs differ from fall ones in that their flower buds are not encased within the bulbs. The bud development of spring bulbs is more dependent on the care received after planting. For the best results, therefore, plant these bulbs in a fully exposed sunny position, where roots of other plants will not compete for food and moisture.

You can plant summer-flowering bulbs as soon as the soil is warm enough in the spring. Constant cultivation throughout the rest of the season is called for to keep the soil loosened. This will keep the soil moist, but water should be added whenever necessary. For continuous bloom, this group of bulbs should be planted successively from spring through early summer.

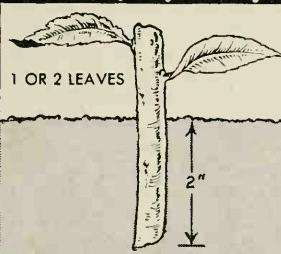
The plants in this group will start to die off from early fall till the first frost, depending on the species. As soon as the plants die, lift the bulbs and cut the top growth cleanly. The bulbs should then be stored in a cool (about 45 deg. Fahrenheit), and rather moist spot for the winter.

CUTTINGS AND DIVISION

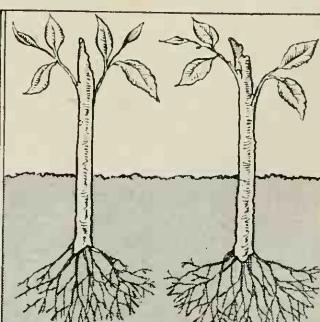
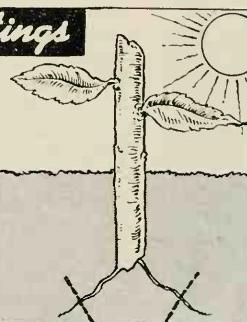


SMALL CLUMP, COMPACT
OR OF SEVERAL STEMS
CUT OR BREAK APART

Propagating cuttings



SET IN SHADE, IN CLEAN PEAT MOSS
AND SAND, AND KEEP DAMP





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The colorful flowers of the Japanese anemone grow on slender stems rising above clumps of large leaves

Below is but one of the many chrysanthemum species
Jackson & Perkins Co.



Flowers For the Home Garden

Achillea (*same botanical name*): The common yarrow is the best known of this species. A perennial, it can be recognized by its bitterish, spicy odor. It has finely cut foliage, and the clusters of white and yellow flowers bloom from June to August. All varieties of achillea prefer a sunny location and range from 18 in. to 3 ft. tall. If seeds are sown indoors in March and seedlings removed outdoors in May, achilleas will bloom the first season. By planting outdoors in September or October, you will have blossoms the following spring.

Ageratum (*same botanical name*): Also known as floss-flower, this plant can be grown from seed. It is covered with blossoms from early summer until the first frost. Most of the varieties bear blue flowers, but white and pink are produced by some. The taller varieties are good for cutting, although most species range from 3 to 10 in. high and are too short for that purpose. For early flowering, the seed should be started indoors in March or April and the plants set out in May. Seeds may be sown outdoors in May, but the plants will not flower until August or later.

Anemone (*same botanical name*): The Japanese anemone, the most common of the species, is a perennial plant. Its graceful cup-shaped flowers bloom in fall. The anemone blossom sometimes grows to about 3 in. across and is excellent for borders and rock gardens. The blooms appear from September to heavy frost. A shady place in good moist soil is all that is needed for good results. The anemone plant may be increased by dividing the roots and transplanting in spring.

Aster (*same botanical name*): There are many varieties of asters and all are grown as annuals. Asters are raised easily by seed and require but average garden soil in full sun. The *alpinus* variety of the aster yields a star-like, violet-blue flower. Only one flower grows on each stem. The *alpinus* aster is not a large plant. It grows from about 6 to 10 in. high. The smallness of this aster makes it suitable for edging in the flower bed. And its blending qualities make it ideal for any spot in the rock garden. In this type of garden the *alpinus* aster will bloom in fall when there is a scarcity of other flowering plants. Seed sown in spring will give blossoming plants the following year.

Begonia (*same botanical name*): Of the many kinds of begonias, the tuberous kinds are the showiest. These have large, bright blossoms that are 5 to 10 in. across and vary in shades from white, yellow, salmon, orange and pink to deep red. Begonias require shade, rich soil and plenty of moisture for their surface roots. Plant begonia tubers early in the year, as they take a

long time to flower. Begonias can be increased by root divisions.

Bellflower (*Campanulaceae*): This plant has attractive bell or wheel-shaped flowers in shades of white, blue, purple, yellow, deep rose and pink. Bellflowers come in annual, biennial and perennial varieties. The tall perennials, such as the chimney and peach-leaved bellflowers, make excellent background borders. For mass groupings, the cup-and-saucer variety is recommended. The perennial and biennial kinds can be started from seed—under glass in early spring and in the open in summer. The perennials can be increased by division of roots. Start annual varieties by sowing the seed in the open in spring.

Bleeding heart (*Dicentra spectabilis*): The drooping, heart-shaped, rosy red flowers are responsible for naming this plant. There are two kinds of bleeding hearts. The fern-leaved type (*eximia*) is a low, bushy perennial. It grows about 1 ft. high and blooms all summer long in sun or partial shade. A taller kind (*spectabilis*) blooms in April and May. The bleeding heart can be grown from seed or root cutting. The seed should be sown either in a cold frame or in a greenhouse. If cuttings are used, cut the roots into 3-in. pieces and plant them in early spring. Cuttings can be taken in the early spring, shortly after flowering, when new shoots grow to about 4 in.

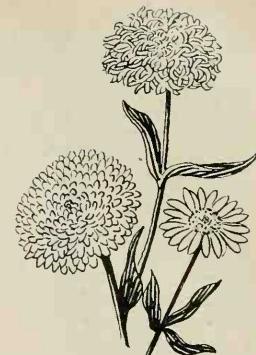
Calliopsis (*Coreopsis*): This gay, hardy and easily grown flower is a member of the daisy family. The yellow, maroon and crimson flowers on wiry stems are grown for cutting as well as for garden decoration. The plants grow from 16 to 36 in. high, making excellent bouquet material. Start calliopsis plants from seed in April and thin until they stand 10 in. apart. One handicap of this plant is the abundance of seed. Remove old flowers so that the plant will not spend its energy and stop blooming.

Candytuft (*Iberis*): Several sowings of this low-growing favorite will give continual blooming in any ordinary garden soil. Candytuft comes in shades of pink, violet, purple, red or carmine. Used in the rock garden or as an edging plant, the annual varieties bloom throughout the season if not allowed to seed. The perennial kinds bloom only in the spring. Sow the seeds of annuals outdoors as they are difficult to transplant. You can expect blossoms in two months. The perennial candytuft is a compact plant, somewhat woody at the base, with white flowers that become lilac with age. Seeds of the perennial varieties may be sown in the fall for next season's early bloom.

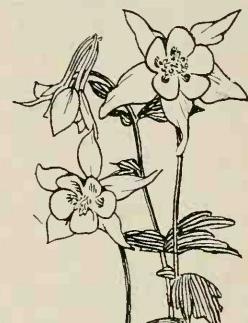
Canna (*Canna generalis*): This summer-flowering plant can be grown in the North if treated as an annual. In tropical climates, the canna grows as high as 10 ft., but in the North rarely reaches 6 ft. Growing from thick tuber-like roots, the canna produces flowers of ivory, yellow, rose, salmon, crimson or scarlet. The foliage is either green or bronze. Cannas can be easily started from seed, which should be soaked a few days before planting. Sow half an inch deep in sandy loam in a box or pot and place in a hotbed or other warm location. When large enough to handle, pot cannas singly and keep under glass until they are ready to be put in open beds.

Castor bean (*Ricinus communis*): Here is a hearty annual which will crowd out other plants if given a chance. For this reason, the castor bean is better used as a shrub. The castor-bean leaves often grow to 3 ft. across and are divided into many lobes. The flowers are without petals and have, instead, dark brown spines that grow in loose clusters. The castor-bean fruit is a capsule containing three large seeds which yield castor oil. Caution should be taken in handling the seeds, since they contain a very active poison. Castor beans may be started under glass in winter and transplanted in May to a permanent spot.

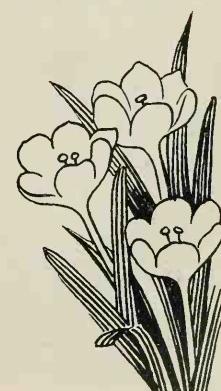
Centaurea (*Cyanus*): You may know this flower by some of its other names— bachelor's button, bluebottle or cornflower. All the varieties of centaurea will grow anywhere in good soil and

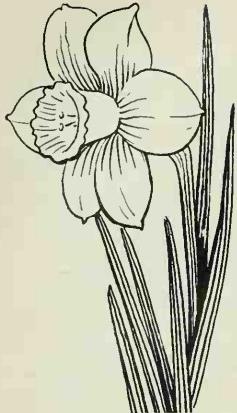


Shown above is the aster,
and below is the columbine



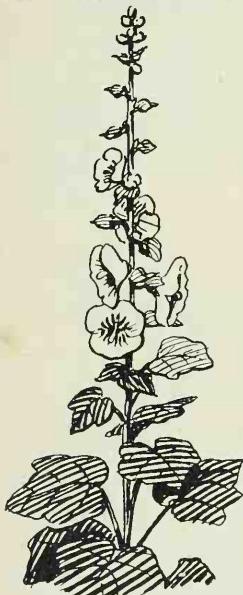
The cosmos, a member of
the aster family, is shown
above. Below is the crocus





Here is the daffodil, a member of the narcissus family

The tall and graceful plant shown below is a hollyhock



The gracefully slender delphinium is among the rare plants whose flowers come in varied shades of blue

U.S.D.A.



are remarkably resistant to disease. They can spare a lot of cut flowers. In fact, the first growth should be cut back heavily so that new growths will bear a second and a third crop of flowers. Centaureas provide the much-needed midsummer flowers, blooming from July well into August.

Chrysanthemum (same botanical name): The small-flowered varieties of chrysanthemum are easy to grow when given good soil and plenty of room. But the successful growth of large-flowered mums requires considerable experience. It may take years to find out just what varieties do best in your garden and just what buds should be selected for the best blooms. The wild ox-eye daisy, the Shasta daisy and the Marguerite, or Paris, daisy are all chrysanthemums. Some are white and others a bright yellow. A few have a maroon or red ring at the center. The hardy chrysanthemums, which resemble the indoor varieties, are of the button-type, or pompon, and the aster-like, or large-flowering varieties. These hardy plants are best planted in spring and should be protected in winter by dry leaves. Good seed is available for this type, and they may be successfully raised by this method.

Cockscomb (Argentea): Chinese woolflower is another name for this gaudy annual. Cockscombs produce large ornamental heads of dense, plush-like spikes sometimes in pyramid shape and sometimes oddly flattened like the comb of a rooster, or ruffled. There are also feathery or plumed varieties with large round heads like balls of tufted wool. The former kinds are usually red or golden, the latter bright red. Plants of the cockscomb type grow from 12 to 18 in. tall, and those of the plume type from 2 to 3 ft. Seeds of this plant should be started indoors in March to provide plants to set in the garden in May.

Columbine (Aquilegia): The columbine is a hardy perennial that produces hanging, gracefully pointed blossoms in early summer. The durable foliage of the columbine turns many rich colors in autumn. In many sections of the country the columbine is known incorrectly as the honeysuckle. Seed sown in spring or early summer will give plants that can be set in their permanent places in September. The following spring they will bloom abundantly with dainty pink, scarlet, white, yellow or large blue blossoms. The columbine grows from about 1 ft. to 3 ft. tall and needs little sun and care.

Coneflower (Rudbeckia bicolor): The coneflower is so-named because of the cone-shaped disk in the daisy-like blossom. The disk is usually brown, yellow or purplish black. Around this disk are bright yellow petals giving the entire plant a very showy appearance. The coneflower is a coarse, summer-blossoming plant, either annual, biennial or perennial. It requires little sun and ordinary soil, and will bloom until late fall. Additional plants can be made by cuttings or by dividing the roots and replanting.

Of the many species of coneflower, the black-eyed Susan (*Rudbeckia hirta*) is the most familiar.

Cosmos (same botanical name): A member of the aster family, the cosmos is a tall plant especially useful for background planting. At one time, the cosmos was not the ideal plant for northern parts of the country because it was so late in blossoming. Now there are new varieties which blossom in midsummer.

Crocus (*Crocus susianus*): The yellow crocuses are the best known of the species. Their brilliant-yellow blossoms appear very early in spring before most flowers. The crocus corms should be planted not later than November. Place the corms about 3 ft. apart and set about 3 in. deep.

If the crocus plants are allowed to die down naturally, the corms will increase from year to year and continue to bloom abundantly until they are crowded. Then they should be dug up and replanted in mid-summer. Where the winters are severe, some protection is needed until the plants are on the way up.

Daffodil (*Asphodelus*): Daffodil is the common name which is given to several hardy types of narcissus, especially the larger, single-flowered trumpet sorts. A trumpet daffodil is recognized by its long, tube-like corona set against a background of wide-petaled segments seated on a leafless stem. In this group are the King Alfred, Glory of Noordwijk, Wear-dale Perfection, Olympia and Van Waveren's Giant. Daffodils add a bold yet delicate and charming touch to the landscape. They are adapted to rock gardens, beds and borders. They are most effective for house decoration when potted in soil, water, pebbles or fiber. Daffodils are grown from bulbs.

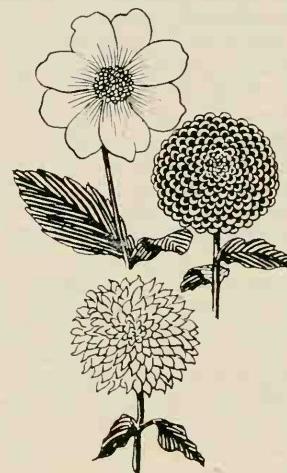
Dahlia (*Dahlia variabilis*): Dahlias may be used to good advantage in borders, especially where a background of shrubbery or trees is available, although many gardeners plant them alone. Planting dahlia seeds and trusting to luck for novel colors may be fascinating, but it is less effective than setting the tubers, which can be purchased from any dealer. A single tuber planted in spring will produce from five to 15 tubers by the end of the season. These may be separated in fall and planted again in spring to make an ever-increasing supply of dahlia stock. There are some 10,000 named varieties of dahlias.

Delphinium (same botanical name): The garden variety of delphinium is a very hardy perennial plant. If the delphinium is given a little special care it will bear exceptionally fine flowers. Plants should be set about 2 ft. apart in rich, light soil where they will get full sun. Delphinium plants require an alkaline condition in the soil. Commercial lime should be sprinkled over the area once during the growing season. If the garden variety of delphinium is cut down to the ground after blooming, it will often produce a second blooming later in the summer. For the best effects, set the delphinium plants in a row by themselves.

Forget-me-not (*Myosotis*): Just one planting in a cool moist place is enough to establish this dainty little blue flower in

the home garden. The self-feeding habit of forget-me-nots provides an everlasting ground cover. While the small varieties of forget-me-nots are good edging plants which bear small, bright flowers early in the season, others are useful in the wild garden. The tall varieties, growing to 18 in., will spread and trail over a large area. All varieties require winter protection.

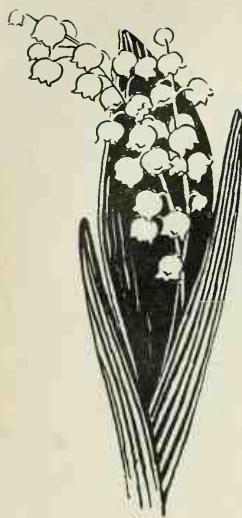
Four-o'clock (*Mirabilis jalapa*): Known also as annual hedge plants, four-o'clocks should be grown by themselves, as their colors do not blend well with other flowers. The plants will seed themselves, but if desired the heavy roots may be dug in the fall and be stored in the cellar over the winter. This plant gets its curious name from the fact that it does not open its flowers until about 4 o'clock in the afternoon except on dull, cloudy days. It is a well-branched plant about 3 ft. tall. The four-o'clock has bright foliage and long-tubed blossoms of good colors and markings, in shades of white, red and yellow. It blooms from midsummer until the first frost arrives. Plant four-o'clocks 1 ft. apart in summer hedges and at 2-ft intervals in a border.



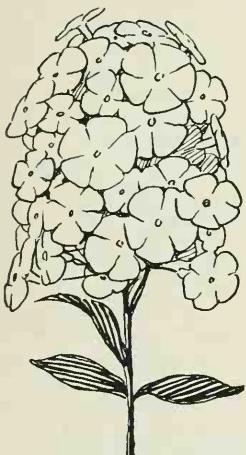
The dahlia, shown above, is best started from tubers in the spring

liage. If not given too rich a soil, geraniums blossom continuously in colors ranging in pure white, rose, salmon, pink, scarlet and crimson. Geraniums need a greenhouse or a warm room in winter, but old plants are rarely worth keeping from season to season except for providing cuttings for new plants in the spring. If large specimens are desired, pot up the old plants before frost, cut back a little and carry them through the winter like other tender pot plants. Nipping off the top buds will induce uniform and bushy growth.

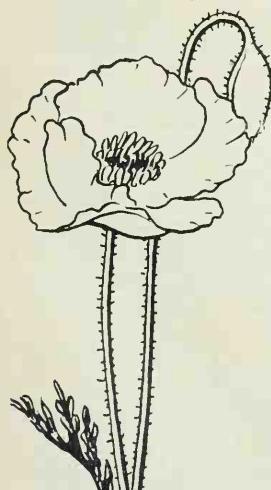
Gladiolus (same botanical name): This tender-rooted member of the iris family is a comparatively modern garden flower. Gladioli are grown from corms, the bulb-like lower stems. These should be handled carefully at all times, since even slight bruises may cause infection and retarded growth. Plant the corms outdoors in spring, as soon as the ground begins to warm. Flowers appear from 75 to 90 days after planting, and successive plantings can be made to insure flowers all summer. The



Above: lily-of-the-valley



Shown above is the phlox; below is a kind of poppy



corms should be dug up in the fall. You will find a new one has developed on top of the old corm, now black and shriveled. The new corm is stored for planting the following spring. Adjoining the roots are two small cormels. After two seasons they will become corms.

Globeflower (*Trollius europaeus*): Growing to about 15 in. high, the globeflower, with its large, rounded, lemon-yellow to deep-orange blossoms, is ideal for setting in borders. There are both single and double-blossomed globeflowers. Both kinds are perennials. New plants can be grown from seed or root divisions. Plants started from seed take considerable time in developing, and there will be no blossoms until the second season. Seedlings planted in fall will blossom about the same time as tulips the following spring.

Godetia (*Grandiflora*): The dwarf type of godetia grows to about 1 ft. high, is very compact and bears masses of rose-red flowers in leafy clusters. The center of each petal is darkly blotched. A godetia annual cut off at the ground can be placed in water and kept for several weeks. At one time, godetia plants were grown only in a warm climate, but now several hardy varieties have been developed for the North. Sow the seed of the godetia in a sunny spot, where the plants are to stand.

Hollyhock (*Althaea*): This tall and graceful plant will add beauty to a barren wall or screen an unsightly view or fence. The hollyhock develops fig-like leaves on stems that grow from 5 to 9 ft. high. The large single or double flowers are in delicate shades of white, red, rose, yellow and salmon. Seeds sown indoors in May will give flowering plants the following year, which will be at their best the second year. A new strain of annuals is available that produces flowers the first summer if seeds are sown indoors in February. Hollyhocks will continue to bloom yearly if allowed to seed freely. However, for best results, start a new batch from good seed every year or two.

Hyacinths (same botanical name): For strong color effects, grow hyacinths. All varieties of the hyacinth are grown from bulbs. The single-flowering kinds are now more popular than the double ones. They force more easily and are more graceful. Hyacinths come in many colors.

Red: All varieties which produce red flowers make slender spikes. The color is very delicate and will fade when exposed to the weather. Therefore, plant red hyacinths in a protected situation. Some good varieties are La Victorie, General Pelissier, Tubergen's Scarlet, Garibaldi and Roi der Belges.

Pink: The pink color of hyacinths is a rare tint in the flower kingdom. It is extremely mellow and soft, especially at night under artificial light. Good varieties are Gertrude, Beauty, Lady Derby, Queen of the Pinks and General de Wet.

White: White hyacinths are great favorites in the dark winter months. Varieties like La Grandese and Arenteine Arendsen are a pure glistening white; others, like General Vetter, have a pinkish hue; and there are some (Princess Juliana), which are a cream color.

Blue: This is the least common color in flowers and is, therefore, always in demand. Some good varieties include Enchantress, Grand Maitre, King of the Blues, Queen of the Blues and Menelik.

Lilac, Purple and Violet: This color group is the most variable. Among the new varieties in these colors are Sir William Mansfield, King of the Violets, Lord Balfour and Distinction.

Iris (*Iridaceae*): The iris has been called "the poor man's orchid." Flag is another common name for this flower, which has three gracefully drooping petals and shiny, sword-shaped, dark-green leaves. The iris is not a florist's flower, since it does not ship or keep well. In the garden, however, the story is different. Few flowers yield so lavish a return for so little effort. Irises are grown from bulbs and root stocks. Because their greenery is

attractive even when the flowers are not in bloom, irises make excellent border plantings. They are early bloomers, following closely after tulips.

Larkspur (*Delphinium*): These garden favorites grow on wand-like spikes bearing many flowers in shades of white, pink, red, lavender and deep purple. The larkspur is a member of the delphinium group. The real delphiniums are a highly bred species in which the flower spikes are of remarkable size, beauty and variability. The larkspurs are smaller and of looser form. The rocket larkspur grows from 1 to 4 ft. high and bears a fine array of flowers all summer. Another variety, the perennial bouquet larkspur, often blooms the first year with large blue or white flowers on plants about 3 ft. tall. The bee, or candle, larkspur has been so extensively bred and improved that it has developed gigantic spikes of large, often double, flowers generally known as delphiniums.

Leopard flower (*Belamcanda chinensis*): The leopard flower is very soft orange in color and spotted with red. It is also known as the blackberry lily because the seed pods are round, glossy black and grow in clusters. The leaves resemble those of the iris, but the leopard flower opens out flat. New plants can be started from seed or root divisions.

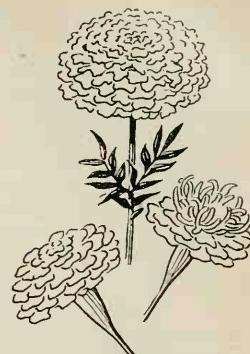
Lily-of-the-valley (*Convallaria majalis*): This plant consists of two oblong leaves and a single one-sided cluster of flowers which are small, white, bell-shaped and very fragrant. After a few years in the garden, lilies-of-the-valley sometimes produce more foliage and less flowers. If this takes place, dig up the plants, split up the bulb-like roots and replant, separating each plant so that each one gets its share of moisture. Lilies-of-the-valley grow best in shady and moist locations. In picking the flowers, remember to leave one leaf on the stem. This leaf will feed the rootstock and flowers will bloom again next year.

Lupine (same botanical name): Both the annual and perennial lupines are recognized by their deeply cut foliage and lance-like rays spreading out from the leaf stalks. The flowers, shaped like those of peas, grow in great masses on long-stemmed spikes. The perennial lupines sometimes grow as high as 3 ft. The flowers are mostly blue, yellow, white or rose, and they bloom in May. The annual lupines often bloom till August and make a good effect in mixed beds. Sow lupine seeds in any good moist soil where the plants are to stand. They should not be transplanted because their taproots go very deep.

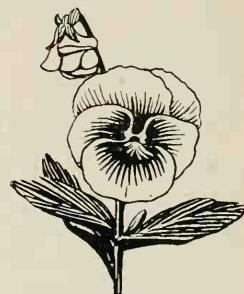
Marigold (*Calendula officinalis*): This annual can be grown almost anywhere. It will blossom into brilliant globes of yellow or orange-tinted petals. Marigolds usually have a pungent odor. They bloom from July until the first frost, with single or sometimes clustered heads on branching plants that grow from 1 to 3 ft. in height.

Nasturtium (*Curciferae*): Here is an attractive annual that will bloom most fruitfully in poor soil in a northern exposure. The funnel-shaped red, orange or yellow flowers appear in both the climbing variety and the dwarf nasturtium. The dwarf nasturtium makes an attractive free-flowering border plant for shadowed walks or covered lanes where very little else will grow. The climbing nasturtium, when supported against a trellis, will reach considerable height in the summer and requires little care.

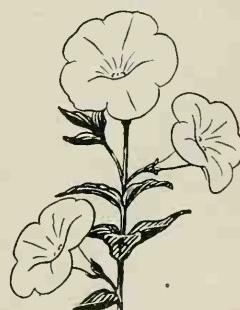
Pansy (*Viola tricolor*): Pansies are common flowers which are very easy to raise, yet not widely grown. Semishade and deep planting to keep the roots cool are the important things to remember about pansies. Seed may be sown any time after frost is past, but it would be better to sow in June for transplanting in late September. In transplanting, it is a good plan to space pansy seedlings between tulip bulbs. This will add a carpet of bloom in the spring under the tall, flowering tulips. Pansies can be multiplied by seeds, cuttings or layering.



Marigold (above) and pansy (below) are two annuals easy to grow



The peony, above, is a perennial, while the petunia, below, is a popular annual



Peony (Paeonia): This popular garden perennial ranges in color from white through pink and red to the darkest purple, with a few yellows among the newer types. Peonies also come in various shapes. The foliage alone is decorative from early spring to fall. The bomb variety has pink petals surrounding a creamy center. Another, the Japanese balloon-flower, has globular buds that open in starry flowers.

Petunia (same botanical name): This pleasing annual succeeds almost anywhere, even under unfavorable conditions. The petunia grows 12 to 24 in. high and produces single or double flowers of many delicate shades. Petunias may be raised from seed or grown from cuttings. In recent years, new and beautiful strains have been added to the petunia list, the new blossoms being of unusually large size and finely fringed. Seed is best started in March or April in a hotbed or in a box placed in a sunny window of the house.

Phlox (Polemoniaceae): The phlox is beautiful in all varieties—dwarf types and tall, perennial and annual, large flowering species and miniature-flowered kinds. The annual phlox *drummondii* is a dwarf which develops more excellent colors than the tall perennials. Best results are had by sowing seeds indoors and transplanting seedlings outside. The perennial, or hardy, phlox, with large heads of bloom, is the most commonly grown variety. An interesting feature of the taller-growing varieties is that

the long, straight roots, shoots and stems can be cut into short lengths and planted like seed and not hurt the original growth.

Poppy (Papaver): Because they are easy to grow, poppies are widely used in beds, borders and rock gardens. One of its varieties, the Shirley poppy, is considered one of the finest annuals. Seed for the annuals is sown in the fall or very early spring in the spot where the plants are to stand, for it is difficult to transplant this variety. The double-flowered and fringed varieties of the poppy are most attractive as cut flowers and will last for several days if gathered before full bloom. The hardy perennial Oriental poppy, with its beautiful scarlet, pink and crimson flowers, makes a pleasing sight in June.

Primrose (Primulaceae): This low-growing plant blooms in nearly any color or combination desired, though white, pink and yellow are most common. The primrose requires a semishaded location and does its best where it is cool, moist and well drained. Eastern and northern exposures are suitable for the primrose. Any of the plants may be raised from seed sown in a warm greenhouse in February. Seeds should be covered with a finely sifted compost, then kept shaded until the plants take hold. They can be removed later and placed singly in small pots. Hardy species may also be produced by division, which is best done in September. Over winter a light mulch or a covering of evergreen boughs will be enough protection for hardy primroses.

Rose (Rosa): Since the days of Solomon, this "Queen of Flowers" has appeared in gardens, painting, folklore and literature. There are more than 11,000 distinct varieties of roses, but only a few of the more common bed roses will be mentioned here. The site for the rose garden should be selected carefully. A gentle slope to the south or southeast is best, and protection from the strong winter winds is helpful. Roses should be planted away from trees or large shrubs, so that their roots can get a full share of moisture and plant food. Roses planted close to a wall or building are likely to suffer from the reflected heat.

Favorite classes of garden roses include hybrid perpetuals, hybrid teas, pernetianas, Bourbon perpetuals and fairy roses. Among the fall-blooming hybrid perpetual group are: Frau Karl Druschki, white (ever-blooming); Georg Arends, soft pink; Magna Charta, bright pink; Mrs. John Laing, clear pink; Mrs. R. G. Sharman-Crawford, rosy pink; Paul Neyron, lilac rose, and Prince Camille de Rohan, dark crimson. These plants grow to good size and need more room for development than the other bush types. They produce their flowers on shoots from the previous year's wood.

Shown below is one of the many members of the "Queen of the Flowers" family. These are hybrid teas

Jackson & Perkins Co.



Hybrid teas are perpetual bloomers, that is, with proper handling the bushes will make a large display not only in May or June but will continue to bloom freely right up to killing frost.

The pernetianas are really hybrid teas with a strain of the yellow Austrian brier rose, and are usually listed among the hybrid teas. The foliage is heavier and darker in color and glossier than that of most hybrid teas.

Snapdragon (*Antirrhinum majus*): The most important perennial of the figwort family, the snapdragon grows to 3 ft. and bears white to purplish-red flowers. Snapdragons are grouped according to height, such as the Dwarf or Tom Thumb, 6 to 9 in.; Half-Dwarf, 15 to 18 in.; and Tall, 2 to 3 ft. The plant, if grown in garden or greenhouse, is usually treated as an annual as it flowers from seed the first year. Snapdragon seed should be sown indoors in March or April and may be slow in getting started, but after the true leaves have formed, the growth is usually rapid. Small plants can be transplanted to open as soon as danger of frost is over. They will flower from July until frost if the blossoms are picked as soon as they fade. Seed may be planted in the open in August, and the seedlings transplanted to pots for winter bloom, or the plants can be covered with mulch for winter to give earlier summer flowers.

Stock (*Matthiola*): The best-known variety of this flower is the evening stock. This straggling, branched annual is grown for its small fragrant lilac-colored blossoms that open toward evening. The flowers are very fragrant after twilight hours or after a rain. Evening stock blossoms appear from July through September. The plant is very hardy and grows to about 15 in. high. Seed for the stock plants can be sown indoors or outdoors.

Sweet William (*Dianthus barbatus*): The ever-popular sweet William is the faintly scented species of the dianthus, growing about 2 ft. tall with smooth, broad, green, flat foliage. The large flowering heads range in color from purple, red, rose to white. The blossoms in some forms are double. There are many excellent varieties which bloom in spring and early summer. Though perennials, the plants are best treated as biennials. There is also an annual which grows about 15 in. tall. These bloom in late summer and early fall. Sow seeds outdoors in May and transplant them in August to flower the second season.

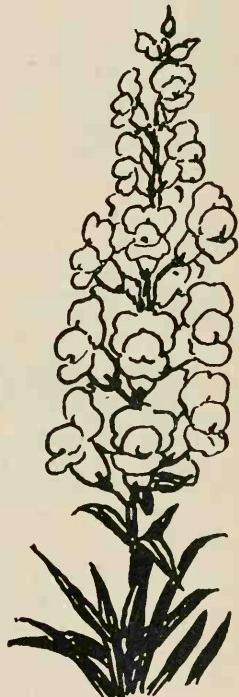
Tulip (*Tulipa*): This bulbous spring flower is probably the most popular in the north temperate zone. It is a group of true bulbs of the lily family, developing into plants with flowers of satiny texture in a wide range of colors—pure, broken and combined. They grow from bulbs planted in the fall.

Tulips should be set out in accordance with a prearranged plan to bring out the effect desired. Where formal bedding is desired, the single-early or double-early sorts are preferred as their stems are shorter and do not need a background to show them off to best advantage. A typical variety of the single early group is the Keizerskroon, with its striking color combination of yellow and red. Practically all tulip colors and many combinations are available in this class. The double-early group has large, peony-like flowers. Peach blossom, a handsome pink, is a favorite of many gardeners. The cottage tulips, the last to bloom in the season, have slender stems, narrow foliage and graceful flowers with pointed petals. Mrs. Moon, a tall, handsome, yellow tulip, is typical of cottage tulips.

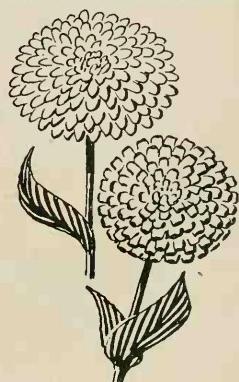
Zinnia (*Zinnia elegans*): Zinnias are in the small shrub class, usually grown as annuals. They bear many double flowers ranging in shades of rose and orange. The zinnia plants are arranged in three sizes—tall, 30 in. or more, to be planted about 2 ft. apart; medium, growing to about 20 in., and dwarf, to about 15 in. The medium and dwarf plants should be planted about 12 in. apart. Seed may be sown indoors about the end of March or at the same time as other annuals.



Snowdrop is shown above



Above is the snapdragon.
Shown below is the zinnia



Growing vegetables in your back yard

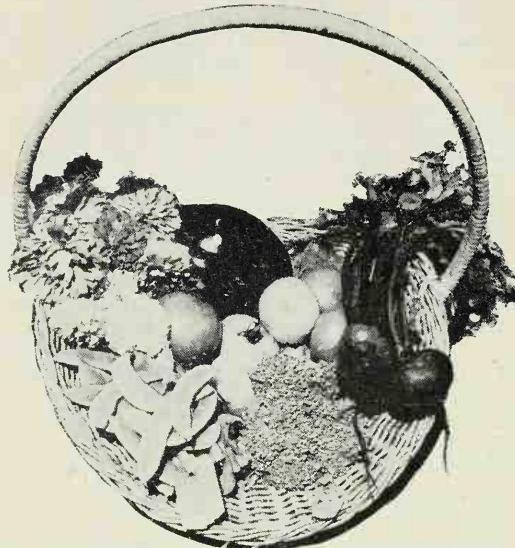
VEGETABLE gardening has few rivals as a useful, enjoyable and healthful hobby. And it's an excellent way to make extra space pay off. Not only can you cut down on your food budget, but you can obtain varieties of vegetables that can't be bought at stores. Fresh vegetables at the height of perfection are also yours, and no store-bought crops can compete in freshness and flavor.

Planning

Whether you garden on a small or large scale, proper planning will be the key to a successful crop of vegetables. The so-called "ideal site" for a vegetable garden is not always within reach of the average home gardener, who has to make the best of what land he has. However, there are certain factors which make for successful gardening, and these should be mentioned so that the home owner can come as close to them as possible.

For the sake of convenience, the vegetable patch usually is best located as close to the kitchen door as the landscape plan allows. This spot should have a conveniently available water supply. The ideal garden is one which is flat and rectangular with the vegetables planted in straight, parallel rows. These rows, if possible, should run north and south in order to receive maximum sunlight—at least six hours a day is required for healthy vegetable growth. An exposure to the east, southeast or south is recommended. Woods, buildings or tight-board fences to protect the garden from the north, west and northwest winds add to the ideal situation. Keep the garden away from shallow-rooted trees and shrubs, for these cast too much shade and absorb lots of water and plant food from the soil.

You may not be able to meet all of the above requirements, but there still is much you can do to plan your vegetable planting. Your first assignment is to think over carefully what crops you want to plant. This will be based entirely on what vegetables



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A vegetable garden in your back yard will mean ever-fresh and tasty harvests like that above throughout the season

your family enjoys most. Also give some thought to the nutritional value of the vegetables you plan to grow. After you have drawn up a list of the desired crops, you may have to reject those your grounds cannot accommodate. The first group to go should be vegetables that take up a lot of room and are little used, such as the pumpkin, sweet potato, watermelon and cantaloupe. You can also discard staples like the potato, cabbage, turnip,

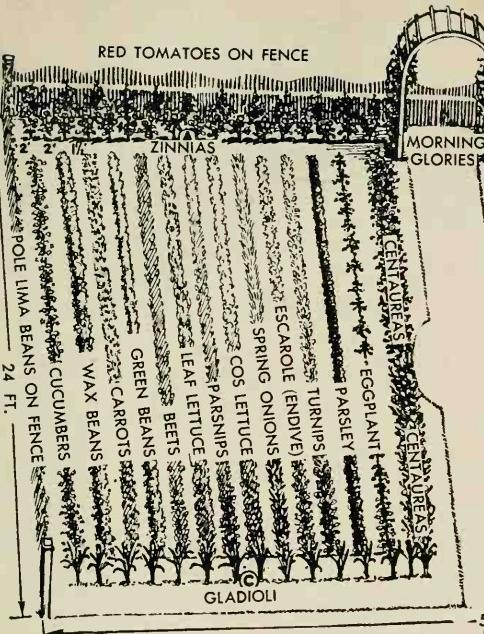
rutabaga and other winter vegetables which can be purchased at the store throughout the year. If still more vegetables have to be eliminated, those that occupy ground over a whole season (for example, the parsnip, salsify, chicory, leek, etc.) may have to go. But don't rule out crops in this class if there is room. The process of elimination will depend on the amount of room you have.

In planning your vegetable garden, you should have three basic aims: (1) to have an all-season harvest, where possible, of all vegetables grown; (2) to produce an abundance of every crop without wasteful surpluses and (3) to use the land continuously so that a maximum yield for the space occupied is obtained. There are a number of ways that these aims can be attained.

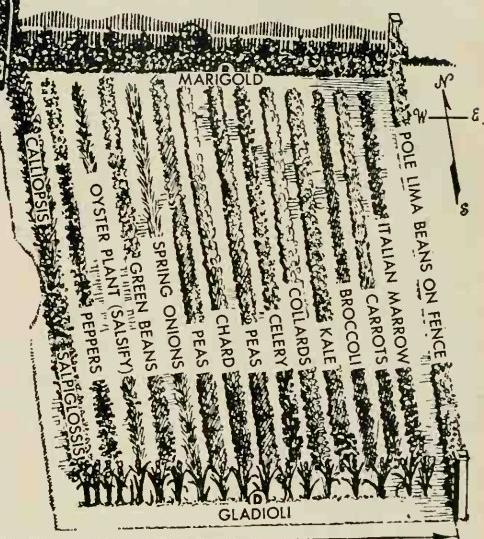
The first thing to do is to decide what perennial crops you want to grow and locate these where they will not be disturbed. To save space, however, quick-maturing annual crops can be planted between the perennials in the spring and left there until the permanent crops need the space.

Next come the annual crops which need to be sown but once during the season. Plant these with some idea as to how much can be consumed and put up for the winter. The table in Fig. 1 will give you an idea how much space some of the crops in this group need to produce one serving for a family of four. You can count on a good harvest during the months of July, August

RED TOMATOES ON FENCE

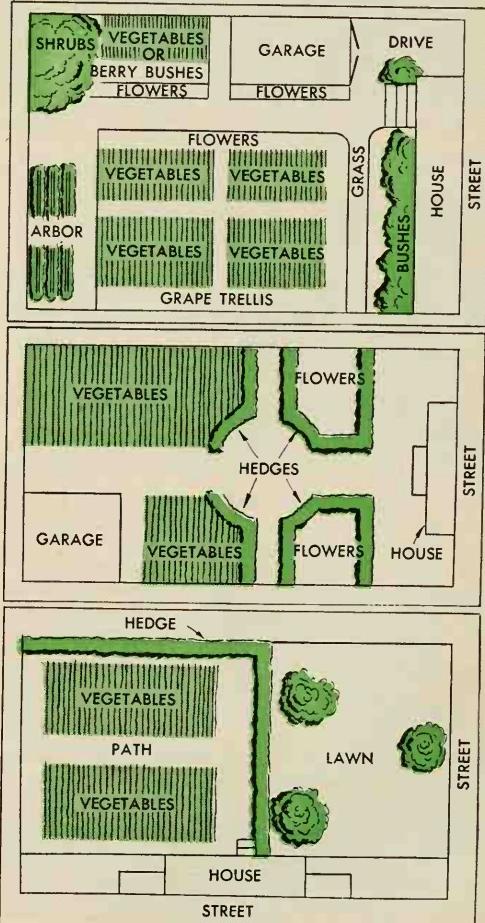


YELLOW TOMATOES ON FENCE



and September plus several days in June and October. Decide about how many times your family will want a certain vegetable during the harvest period and multiply this by the amount of space listed in the table. Say you want broccoli once a week. This vegetable needs 2 ft. of space in a row to provide one family serving and can be harvested for about 13 weeks, so you should sow 26 ft. of broccoli. Also take into account the amount of each vegetable you will want to can or store for the winter. The space estimates given in the table assume fertile soil and should be increased if you doubt the quality of your soil. In making your estimates, don't count on the table as an exact guide but rather as a general one to help you balance your garden yield with your family needs and avoid having wasteful surpluses of some crops followed by scarcity of others.

The short-season vegetables will require more attention than any of the other groups, for their seed will have to be sown several times during the season for a constant harvest. Where these short-harvest crops are concerned, don't plant all the seed at the same time. Instead, divide the total production into several sowings, timing them so that one harvest will follow another as fast as you can use the crops. Keep in mind that the crops grow faster in the spring, and as the weather becomes warmer and drier, growth will slow down. Therefore, second and third plantings must be given more time to mature. There are also some plants (like lettuce, peas, radishes,



ALL-SEASON VEGETABLES

| Vegetable | Grow for four-portion serving |
|----------------------|-------------------------------|
| Lima Beans | 2 ft. |
| Broccoli | 2 ft. |
| Cabbage | 2 ft. |
| Celery | 1 ft. |
| Eggplant | 1 ft. |
| Leeks | 2 ft. |
| Parsley | 1/2 ft. |
| Parsnips | 2 ft. |
| Peppers | 1 ft. |
| Rutabagas | 1 ft. |
| Spinach, New Zealand | 1/2 ft. |
| Squash | 1 ft. |
| Swiss Chard | 1/2 ft. |
| Tomatoes, Staked | 1/2 ft. |

FIG. 1

spinach and turnips) which will not do well in extremely warm weather and should be given a vacation during this period. The more popular vegetables in this group are listed in the table in Fig. 2. Study this table and find out how soon after sowing you can use a certain crop, how long it will stay in top condition and how much space a four-portion serving requires. You can thus get a general idea how much seed to sow and how often.

Companion cropping: There are two "tricks of the trade" which will enable you to get maximum production from your land. The first of these is companion cropping. This involves planting early-maturing crops between rows of late-maturing ones. In this way, two rows can be planted in the space usually occupied by one, as the early-maturing crops mature first and can be cleared away before the late-maturing ones will need the space. Examples of companion cropping are the growing of lettuce, radishes or spinach between rows of cabbage, cauliflower, tomatoes, peppers or onions. Sowing radish seed with that of parsnip, celery or carrot is also a common practice. The radish tops will mark rows for early cultivation before the slower-growing crops come up. Radishes also break up the crust for the seedlings of other crops and can be harvested before the later-growing vegetables need the room. One thing to avoid in companion cropping is overcrowding, for all the plants must have enough room to spread naturally and allow easy cultivation. When care is used, however, this is an ideal method.

SHORT-SEASON VEGETABLES

| Vegetable | Days to table size | Harvest from one sowing lasts | Grow for four-portion serving |
|------------------|--------------------|-------------------------------|-------------------------------|
| Beans, Snap | 44-53 | 4 weeks | 1 ft. |
| Beets | 55-80 | 6 weeks | 1 ft. |
| Carrots | 60-80 | 8 weeks | 2 ft. |
| Cucumbers | 45-75 | 4 weeks | 2 ft. |
| Endive | 70-90 | 6 weeks | 1 ft. |
| Lettuce | 35-90 | 6 weeks | 1 ft. |
| Turnips | 40-75 | 2 weeks | 1½ ft. |
| Spinach | 40-50 | 2 weeks | 3 ft. |
| Sweet Corn | 65-105 | 10 days | 4 ft. |
| Onion Sets | 21 | 4 weeks | 1 ft. |
| Peas | 60-75 | 2 weeks | 3 ft. |
| Radishes, Early | 25 | 1 week | 1 ft. |
| Radishes, Summer | 45 | 2 weeks | 1 ft. |
| Radishes, Winter | 60 | 6 weeks | 1 ft. |

FIG. 2

Succession cropping: Another way to get the most from your land is by succession cropping. As the term implies, this means planting a different crop of vegetables in the same soil as soon as the first crop is harvested. A few examples are radishes followed by string beans; early peas before late cabbage, turnips, carrots or beets; spinach before sweet corn, tomatoes or beans, and early lettuce followed by summer squash. Succession cropping will work only if the soil is kept in fine, rich condition. This means adding a complete plant food at the rate of 4 lbs. per 100 sq. ft. of surface soil every time a new crop is planted. In practicing succession cropping, root crops should not be followed by root crops, and the same holds true for leaf crops. Turnips, carrots or beets, for instance, should not follow radishes, nor should Swiss chard follow lettuce.

The four garden plans shown on page 115 may give you some ideas on arranging your vegetable garden.

Starting Plants Indoors

In the South practically all vegetables can be planted in the open. But in the North and West many crops have to be started indoors, or in hotbeds or cold frames.

Seedbox planting: If you have enough room indoors, you can start several different vegetables in seedboxes also known as flats. Any tightly built box will do. It should have a few holes bored in the bottom to assist quick drainage. Cover these holes with pieces of broken pottery so that the soil will not sift through. If the box is



FIG. 3

A piece of wet burlap over the seed flat hastens germination. A rubber spray ball dampens the burlap well

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loosely constructed with cracks between the boards, the drainage holes may be omitted. Should such a box be used for planting fine seeds, it is wise to lay a piece of burlap over the cracks so that the seed will not be washed away when the box is watered.

Sift and disinfect the soil before it is placed in the box. The soil can be disinfected of disease-causing agents by baking the soil in an oven, heating it with electricity or treating it with hot water or steam. Then firm the soil and make a few depressed rows, as in Fig. 4, in which to plant the seed. Sow the seed in rows (see Fig. 5), rather than broadcasting them, as transplanting will be easier if the former method is used. In sowing the seed, do it thinly, so that the plants will get a fair chance to grow strong enough before they crowd each other out. The seedboxes should be covered with a piece of burlap, cloth or paper, which is kept damp until germination starts. (See Fig. 3.) Remove the paper or cloth as soon as you see the first sprouts breaking the soil and replace with a pane of glass. When water evaporates and collects on the glass, wipe it off to keep it from dripping into the seedbox. Prop up one edge of the covering glass during the day for ventilation.

Keep the seedbox soil moist but not water-logged. If you have provided the box



FIG. 4

Make straight parallel rows in the seedbox in which to sow the seed. This is better than sowing broadcast

FIG. 5

Sow the seed in flats as evenly and thickly as possible, so the plants will have ample room to develop

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FIG. 6

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You can make your seed flats self-watering through a hole from which a cotton wick leads out to water

FIG. 7

With the wick installed, the flat is placed over a pan of water, and the soil is kept constantly moist

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with good drainage, there won't be anything to worry about, provided that the soil is soaked once a day. To do this, simply lower the seedbox into a pan of water. An excellent way to provide a constant water supply for the seedbox is to set up a self-watering system. Bore a single hole in the bottom of the box, as shown in Fig. 6. Then insert a cotton wick, obtainable at any garden-supply store, in the hole. A few inches of the wick should project from the bottom of the box (see Fig. 7), and the long end should be coiled in the inside of the box. Then place the box over a pan of water and allow the projecting piece of coil to dip into the water. The wick is constantly saturated with water, which is transferred to the soil in the seedbox. In this way, a constant and uniform amount of moisture will be available to the seed, and later the seedlings, as long as the pan is kept filled with water.

Be sure that the seedbox has all the sunlight possible. Where there is not enough light, the seedlings will try to reach for it and grow tall, spindly and weak as a result. Humid air is also desirable. A good place to keep seedboxes is near a kitchen window facing south, for there will usually be enough sunlight from that direction and kitchen air usually has enough moisture.

When the seedlings get large enough to be handled, they should be transferred to individual clay or paper pots, berry boxes, wooden or paper plant bands, eggshells or paper cups filled with sifted, rich soil. Keep the plants growing in a bright, sunny place until it is nearly time to transplant them outdoors. At this time harden them by placing them by an open window or in a sheltered spot outside for a little while each day, gradually increasing the time.

Planting in hotbed or cold frame: If the space indoors is limited or you would prefer not to clutter up the house with seedboxes, you can also get excellent results from starting your crops in a hotbed or cold frame. A hotbed and cold frame are constructed in the same way, except that the hotbed is artificially heated. The hotbed is an exclusively Northern construction, where it is used to start tender plants. The cold frame is used in the South for the same purpose, while also serving in the North to toughen plants already started indoors or in hotbeds. It can also be used to carry young, hardy plants over winter.

Although ready-made heating units can be purchased reasonably at seed stores, you can make one yourself fairly easily. In building a hotbed or cold frame, place it on the south side of a building, garden wall or board fence. A pit of about 18 in. deep should be dug, with a width and length of the desired size. The standard dimensions

are 3 x 6 ft. to accommodate a single sash. The front, or south side, of the construction should be 8 to 12 in. lower than the back, so maximum sunlight is admitted and water drains off the glass. The hotbed can be heated either by filling the pit with manure or by arranging an electrical heating system. If the former method is used, spread layers of stable manure in the bottom of the pit, trample down well and sprinkle with water if dry. Then place about 5 in. of well-sifted, rich loam from the garden on top of the manure. Put the sash in place and allow the bed to heat up for three or four days. The temperature will be quite high at first, but do not plant until it falls below 80 deg. Fahrenheit. The hotbed sash should be raised slightly on very bright days for ventilation and to prevent overheating. But take care to protect the young plants from drafts by opening the side opposite the wind, and be sure to close it again in time to let the bed warm up before night. The best time to water the plants is in the morning on bright days, after which the sash should be left open until the seedlings dry off. Careful watering and ventilation are important steps in preventing loss of young plants from the damping-off disease. As the weather becomes warmer, the sash may be removed entirely to harden off the plants, but it should be replaced on cool nights or whenever the temperature drops suddenly.

Of course, if you do not care to go to the trouble of building a frame, you can still grow a few of each of your favorite vegetables by buying young plants from a reliable dealer.

Planting Vegetables Outdoors

A definite date cannot be given for outdoor planting as weather conditions differ widely according to location and season. Always allow for the late frosts which may injure or kill young plants, and wait until the weather is settled and the soil is warm before seed is sown or seedlings transplanted outdoors. However, if extra-early yields are wanted badly enough to warrant the extra work, plant protectors of various types can be used until the weather is settled.

Soil preparation: The ideal soil for the vegetable garden is a loam, or better still, a sandy loam. If you do not have this type of soil, every attempt should be made to approach the ideal. A clayey, compact and cold soil can be loosened and warmed up by adding sifted coal ashes and humus to it, and, in spring, by top-dressing of lime or wood ashes. A loose, sandy soil that does not retain water and plant nutrients can be made more retentive by the addition of humus. After making sure that the soil is well drained and properly aerated, cultivate deep into the ground. Either double digging or trenching can be used to good advantage here.

Plant food: The need for plant food varies from one kind of vegetable to another, but certain generalizations can be made. Where manure is not easily obtainable, a commercial fertilizer containing 5 percent nitrogen, 10 percent phosphoric acid and 5 percent potash can be substituted at the rate of about 4 lbs. per 100 sq. ft. You don't have to spade in modern plant food as you would manure. Just broad-



FIG. 8
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Apply commercial fertilizer evenly on both sides of the drill in which the seed is sown

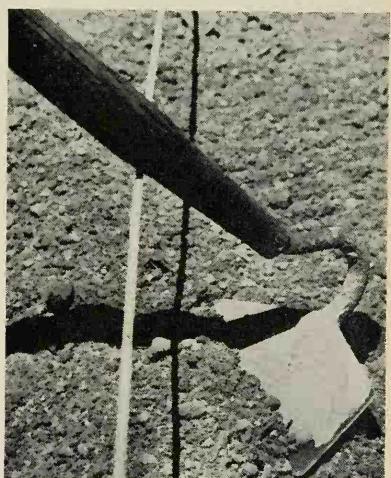


FIG. 9
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Work the fertilizer into the soil lightly
FIG. 10
Garden line stretching between iron reels makes a good ruler for sowing the seeds
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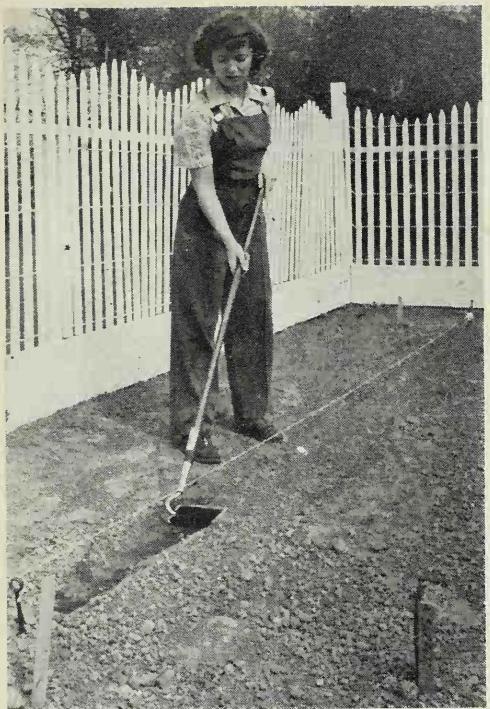


FIG. 11

It is a simple matter to draw a seed drill with the corner of a hoe by using a garden line as a guide

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FIG. 12

Following the line, it's easy to sow small seed. Tiny seeds can be sown directly from the package

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cast it and rake it into the top 3 in. of soil. Additional applications can be given throughout the season at the rate of a tablespoon to a yard of planted row. It is especially important that the soil is revitalized when a sowing immediately follows a harvest. Spread the plant food in shallow trenches (Fig. 8) on both sides of the row where seeds are sown, applying up to 4 lbs. per 100 ft. of row. The plant food trenches should be about 4 in. deep and at least 2 in. away from the seed drill. Pour in the plant food evenly and work it into the soil with a hoe (Fig. 9). Then you proceed with the sowing. Long-season crops should also receive additional feeding, especially after the first tiny vegetable form. Liquid fertilizer can be applied easily on the soil around each plant. A tablespoon of plant food can also be worked into the topsoil near the base of each plant and well watered. In the case of row crops, apply the plant food on the soil along the row and water in. Avoid bringing the plant food in contact with green leaves and stems. When this happens, wash the chemical off with a hose with a sufficiently strong spray to clean the leaves quickly and thoroughly.

Leafy vegetables, such as lettuce and spinach, usually need extra nitrogen, and a top-dressing of nitrate of soda will prove useful. A fertilizer containing a higher percentage of potash is needed by root vegetables like beets, carrots and turnips. Since some vegetables require very rich soil while others may be harmed by such a soil, it is essential that the prospective vegetable gardener study the needs of each vegetable carefully. Most garden vegetables prefer a slightly acid soil, so lime should be used sparingly. Exceptions to this rule are asparagus, celery, beets, spinach, lettuce and carrots, all of which prefer a definitely lime soil. Where lime is required, it is best applied in the fall.

Seed sowing: After the soil is in condition for planting, the next step is to indicate where the seeds are to be sown. To make sure that your plants will grow in straight, parallel rows, you will need a row marker. A straight, narrow board is used by some gardeners. A garden line (see Fig. 10) is usually more handy. This consists in stretching a strong cord between iron reels or two stakes. The resulting line is then used as a guide to draw a shallow trench, known as a drill, with the corner of a hoe, as in Fig. 11, or with the end of a hoe handle. A drill about $\frac{1}{2}$ in. deep is sufficient for small seeds such as those of onions, carrots, lettuce and endive. Seed for beets and Swiss chard require a little deeper drill, while about an inch is required by peas, beans and sweet corn. The drills may be shallow for spring sowing, but should be a

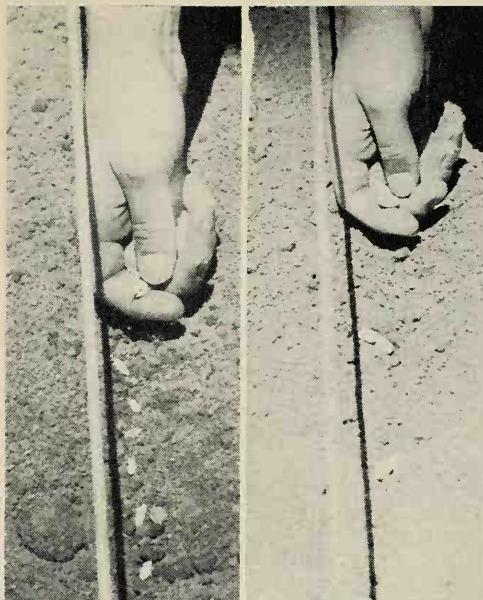


FIG. 13

Large seed is sown with the fingers, singly as at left, or better, two in the same spot as at right

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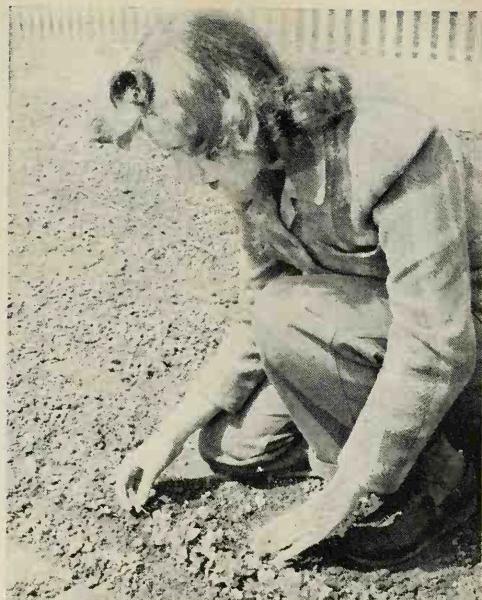


FIG. 14

Thinning out the young seedlings is very important. The best practice is to pull out every other one

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little deeper for planting during summer.

The space between the rows will depend on the way the garden is to be cultivated and the special needs of the vegetables to be planted. Where hand tools are to be used and the vegetables will grow no higher than a foot, a space of only 10 in. between the rows will be sufficient. If cultivation is to be done with a wheel hoe, a distance of at least 18 in. will be needed so that the roots will not be disturbed. Vegetables that grow on vines will need more space; even as much as 3 ft. of space may be needed for such crops as cucumbers and squash. If you have to sow the seed on a slope, run the rows across the slope, not up and down, to prevent washing and erosion.

Sowing seed correctly is a delicate technique, one which can be perfected only with practice. Certain pointers, however, may prove helpful to the beginner. The first thing to keep in mind is never to plant too deeply, as the seed may be smothered before it can find enough strength to thrust shoots through the soil. A good rule of thumb is to cover the seed with its own depth of soil. Tiny seed would thus almost lie on the surface.

In sowing small seed, you can let them drop from the package in which they came, as in Fig. 12. Or, take a few in your hand and let them fall through the fingers into the drill. Put your hand near the ground and drop the seed as evenly as possible, spaced so that the stems and roots will not be jammed up eventually. Larger seeds

which can be grasped singly are easier to handle. These can be spaced more accurately at the distance the plants are to grow. But as there is always the risk that some seedlings will not develop, sow large seeds in pairs, as shown in Fig. 13. If both of them grow, one plant can be pulled up. In the case of beans, both plants may be allowed to grow with little harm. Thinning will, however, be essential with most plants.

For the maximum yield, it is best to plant plenty of seed, but not too much, and to thin out the excess plants. No matter how good your seed is, accidents occur to destroy seedlings, and there should be spares to replace these losses. It is just as important, however, that the stand is gradually thinned to allow the plants enough room to grow and yield successfully. In thinning out vegetables, do it by degrees. Uproot the plants gently, as in Fig. 14. When you thin out for the first time, leave the row crops standing an inch apart. As they grow, remove alternate plants until the ideal spacing is obtained. Where some crops are concerned, half-grown vegetables which are pulled up to give the other plants more room provide delicious servings. Young carrots and beets and many of the leaf vegetables are examples.

There are certain vegetables, such as cucumbers, bush and vine squash and pumpkins, which are best grown in hills. This means sowing the seed at a certain point rather than in a line. The term "hill" may be misleading, for actually the seed is



FIG. 15

Holes for seedlings should be ready before the plants are touched

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FIG. 16

The reason for individual containers for each plant is to keep the shock of transplanting to a minimum

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FIG. 17

Put the seedling into the hole immediately. Guard against air pockets by packing dry soil around the plant. Firm the soil well, adding more if necessary

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planted in hollows rather than on mounds. The hills are lined up in straight rows and spaced at equal distances apart. A shallow hole is dug up with a trowel, and plant food is mixed with the soil in the bottom. After more soil is filled on top of this, the seed can be planted, using a little more than plants to be grown. The surplus plants are thinned out as soon as the crop begins to get thick. A slight depression should be left above the seed, so that moisture from light rains and heavy dews can collect to hasten germination. To make cultivation as easy as possible, mark each hill with a stake until the plants pop up. Line the hills up accurately, so that cultivation between the rows can be carried out with the same ease as between drills.

Transplanting: Now we return to those tender seedlings you raised indoors or in a hotbed, or bought from a reliable dealer. Remember that these are to be brought out of doors only when all danger of frost has past. The seedlings can be planted from 2 to 5 in. apart, depending on the size they will eventually attain. The easiest way to transplant is directly from the pots, as shown in Fig. 16, as there will be practically no disturbance to the roots. The ground should already be prepared—dug, raked, fertilized—and rows spaced and marked off. When you transplant, choose a cloudy day before a rain or do the work in the evening. Lift each plant carefully from the seedbed or cold frame, or knock it out of the pot or other container, keeping as much soil as possible around the roots. Set each plant in the hole dug to receive it. Partly fill the hole with soil and apply water and let it soak in. Or you may fill the hole with water before the planting is done, as in Fig. 15. The rest of the hole can then be filled with dry soil, and this should be firmed well around the plants (See Fig. 17).

Watering: Proper watering is a must in successful vegetable gardening. At least an inch of water a week is necessary for vigorous growth; more is needed in sandy soils. Rainfall seldom provides a consistent and sufficient supply of water, so some means of artificial watering has to be provided. A canvas hose, preferably one which reaches the length of the garden row, provides an excellent system of watering, as the water oozes out slowly and soaks into the ground. Any method of flowing water directly on the soil without washing out

miniature gullies will do. Lawn sprinklers are not advised, as too much water is wasted through evaporation.

In determining how often to water, the old-time practice of giving the plant a drink of water when it's dry is still the best one. Giving the plants a week's supply of water at a time is a far wiser practice than giving them a daily sprinkling. Water should be kept off vegetable leaves as much as possible, especially those of lettuce, chard and other leaf crops. Therefore, the best time of the day to water is in the morning, so that if water should get on the leaves, there will be enough time for them to dry off before night comes.

The more common vegetables are listed below with special instructions as to their culture. Following the list of vegetables is one of common herbs, which you may like to grow alongside the vegetables.

Vegetables

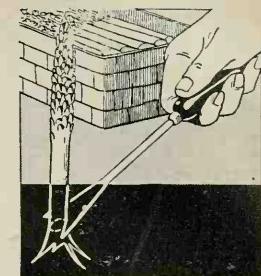
Asparagus: This perennial can be harvested from early spring to July. The easiest way to start asparagus is from one-year-old roots, preferably a rust-resistant Washington strain. About 60 to 70 roots are needed for a 100-ft. row. Prepare trenches which are 15 in. deep and 18 in. apart. A 3-in. layer of manure should be placed at the bottom of each trench and covered with 4 in. of rich soil before the roots are planted. Place the roots in the trenches and cover them with 2 in. of soil. As the shoots come up, keep covering them with soil until the trench is level with the rest of the ground. Do not cut any shoots until the second or third year.

Beans: Whatever kind of beans you plant, wait until all danger of frost is past before setting them outside. Prepare a good, light, well-drained soil, with manure and general fertilizer mixed in. Cover the seed with 1 in. of heavy soil or 1½ in. of lighter soil. Place bush beans 2 to 4 in. apart in rows spaced 18 in. to 3 ft. apart, or three plants each in hills 8 in. apart. Snap beans, or string beans, mature in six or eight weeks, so their seed should be sown at two-week intervals for a continuous supply. Pole beans, which require more room, should be planted in hills 3 to 4 ft. apart each way. Put about 10 seeds in each hill and later thin out to four healthy plants. They are best trained on poles, trellises or a wire fence.

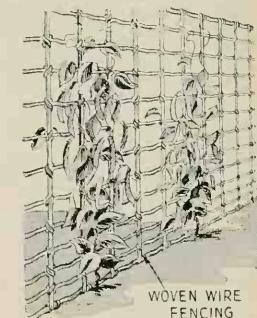
Beets: This hardy vegetable thrives in any good soil so long as you avoid the use of lime and excessively rich manure or nitrogenous fertilizer. About 1 to 2 lbs. of complete, balanced fertilizer for every 50 sq. ft. of area can be used. Sow the seed no more than 1 in. apart in rows which are 12 in. apart. Cover with 1 in. of soil and expect the seedlings to appear within 10 days. Wait till the plants are 4 to 5 in. high before you thin and transplant them. Then cut off half of the tops and place the roots straight down in the hole. For a continuous harvest, plant beets successively two or three weeks apart.

Broccoli: You can grow two crops of broccoli, starting one in the hotbed or cold frame in February and sowing seeds for the second in June or July. Use the Italian strain of green-sprouting seed for the best results. Broccoli requires an average, reasonably moist soil, enriched with manure, a 4-8-10 fertilizer and a top-dressing of nitrate of soda. The plants can be spaced 2 ft. apart in rows, leaving plenty of room between rows for cultivation. As the broccoli head is the flower head in bud, harvest the crop before the yellowish flowers open. You can obtain a fairly long harvest by constantly cutting the fully formed heads when they are 6 in. long.

Brussels sprouts: This vegetable may be harvested as late as the last three months of the year and will grow in most parts of the country where the soil is fertile and moist. You can sow the seed outdoors in May and transplant in August when the plants

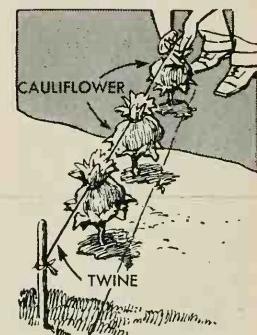


To keep asparagus stalks from bleeding, cut them at a slant just below the surface of the bed. The cut will heal and allow the plant to reproduce easily



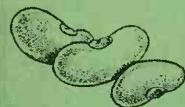
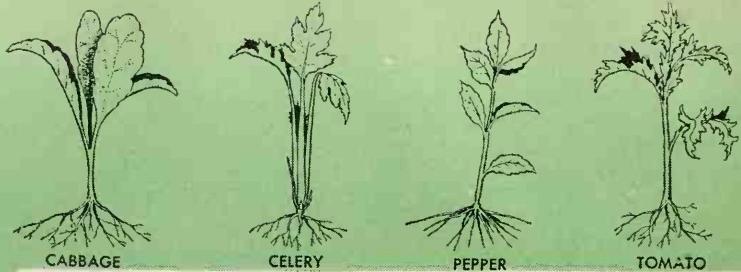
WOVEN WIRE FENCING

A length of woven-wire fencing along the row provides a good trellis for climbing vines. If the rows can be planted north and south, vines will be exposed to sunlight throughout the growing season



To blanch cauliflower, run a length of twine between two stakes, looping it once around the gathered leaves of each plant, thus enclosing the heads and sheltering them from the sunlight

Some varieties of vegetables, such as the cabbage, celery, pepper and tomato, are best planted as seedlings. Others, like beans, beets, corn and peas, grow best from seeds. A few, like the onion, are planted in sets. The potato provides its own eye for planting.



BEANS



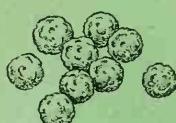
BEETS



CORN



ONION SETS



GARDEN PEAS



POTATO

are from 5 to 7 in. high. Pinch off a few leaves and set the plants 15 to 18 in. apart with 2 ft. between the rows. Apply a nitrate-of-soda top-dressing, about 1 lb. to 100 ft. of row, two weeks after the plants are set. When the buds develop and begin to crowd, break off the lower leaves to allow more room. Do not take off the top leaves as these supply the nourishment.

Cabbage: This vegetable also has to be started indoors or in the hotbed in the North, or from plants bought for spring planting. The fall crop can be started from seed sown outdoors in May. A well-drained, fertile soil with manure, fertilizer and a top-dressing of nitrate of soda is required. Plant early cabbage 12 in. apart with 2 ft. between the rows. The later crops will form larger heads, so should be set at 18-in. intervals with 30 to 36 in. between the rows.

Carrots: This plant can be grown in fall, winter and spring in the South and throughout the summer in the North. Carrots prefer a sandy loam or peat with commercial fertilizer used alone rather than with manure mixed in. Sow the seed outdoors as soon as the ground can be worked in the spring, making successive sowings two or three weeks apart for a constant supply. The seed is to be sown thickly and covered with $\frac{1}{2}$ in. of light soil or $\frac{1}{4}$ in. of heavy soil. Thin the plants two or three times until they are about 3 to 4 in. apart in rows 12 in. apart.

Cauliflower: Here is a difficult crop to grow, but one with which even the amateur will have success if the conditions are ideal. Just remember to sow the seed and set the plants out early enough so that they mature before the hot summer sun beats down on them. The seed is rather expensive, so it is wiser to buy small plants from a reliable grower. About one or two dozen should be enough for the average family. Do not set out more than you can use, as they do not keep well. Plenty of well-rotted manure or compost and fertilizer are needed to encourage fast, uninterrupted growth. This plant requires a lot of moisture, so soak the soil around each plant whenever it gets dry. The flower heads need to be blanched by gathering the leaves around them and tying them loosely with soft string.

Celery: Soak celery seed overnight and mix it with an equal amount of fine, dry sand. Sow this mixture in shallow trenches in a seed box and cover with $\frac{1}{8}$ -in. depth of leaf mold. Place a piece of burlap over the soil to hold in the moisture, removing it when the seed germinates. Transplant the seedlings two times to strengthen the roots. The second time, space them 2 in. apart each way in flats or a hotbed. The plants can be set outside in about two and a half months when they are about 5 in. high. Have a light, fine soil, capable of holding plenty of moisture and humus, ready for the transplanting. Soak the ground before transplanting. Also soak the flats or seedbeds so the soil will cling to the plant roots. Plant the seedlings in double rows 1 ft. apart with plants 6 in. apart; the double rows should be 4 ft. apart. Blanch early celery as soon as it is 1 ft. high, either with a paper celery-blanching tube or by boards placed on each side of the double row and held together by cleats or wire hooks. Late celery

is better blanched by piling soil about the plant when it attains maximum growth. This blanching process takes about three weeks, after which the plant can be dug up.

Chard: This is a type of beet, grown and developed for its top rather than its roots. A rich, light, lime soil is required. Sow the seed clusters widely, as each contains several seeds. Thin the plants until they are 12 in. apart in the row. In harvesting chard, break off the outer leaves cleanly at the base and leave the inner leaves to grow. A crop of chard filling a 30 or 40-ft. row will provide enough for the entire season.

Corn: Early corn is the best kind to grow in the small garden. You can sow at 10 or 12-day intervals for a continuously fresh supply. Any well-drained, fertile soil containing a good supply of humus and reinforced by manure and commercial fertilizer will do. Soak the seed overnight to hasten germination, then sow rather thickly in rows. Thin plants until the smaller varieties are 8 in. apart and the taller kinds 12 in. apart. Corn is ready for harvesting when the ears are firm and full to the touch. More than any other vegetable, corn should be used soon after harvesting.

Cucumbers: This plant takes up a lot of space, but you may be able to grow it even in a small garden if it is trained on a fence or trellis. If the cucumbers are allowed to sprawl on the ground, plant the seed in hills, about eight to 10 per hill, and cover them with an inch of soil. Two to four hills are enough for the average family, and these should be spaced 4 to 6 ft. apart. If the plants are to grow upright, only a space of 1 ft. is needed between each plant. Mix in a tablespoon of plant food in each hill before sowing. It is important to provide protec-



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It's very important to firm the soil lightly but firmly all along the row after the seeds have been planted

tion against cucumber beetles. To do this, cover the hills with wooden frames around which cheese cloth is tacked, the lower edges being held down with earth or stones. The coverings have to be removed when the vines begin to grow.

Eggplant: Sow the seed of this plant indoors or in a hotbed at least six weeks before the plants are transplanted in the open. You can set them outdoors as soon as the third set of leaves appears. Soak the plants thoroughly the night before and plant them 2 ft. apart. Fertile soil is essential, but instead of using fresh manure or large amounts of commercial fertilizer, spade in a leguminous crop the fall before. A single eggplant will yield three to eight fruits during one season if the soil is good and the weather warm.

Endive: Also known as escarole, this plant can be started either in a hotbed or a cold frame, or the seed can be sown outdoors as early as the ground can be worked. Sow the seed $\frac{1}{2}$ in. deep with 18 in. between the rows. Keep thinning out until the plants are 12 in. apart in rows. A succession of sowings two weeks apart from about the middle of June to mid-August will provide a fall crop. Blanch endive as you would cauliflower, being sure that the plants are dry before the process is begun. Blanching



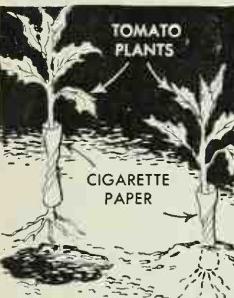
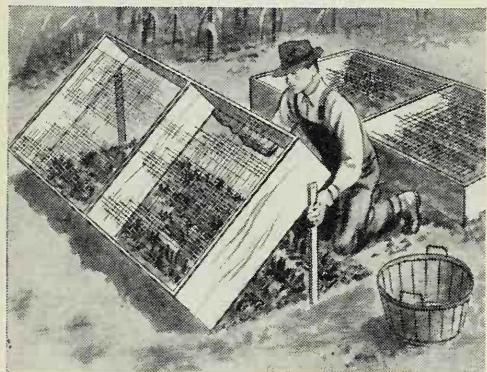
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Thinning out the plants is more than a first-time task. Keep it up until all the plants become sturdy ones



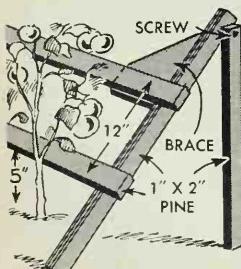
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Remove young plants started in flats indoors or in hotbeds and place them in a cold frame for a time so they will grow sturdy enough for outdoor planting



Above, radishes can be kept worm-free if protected by wooden frames covered with either screen wire or coarse mosquito netting

Left, protect tomato plants from worms by wrapping the stalks with cigarette paper. The paper should extend 1½ in. below the surface of the ground



A slanting trellis or rack like the one shown at the left will keep the tomato plants from sprawling over the ground. The racks are 6 ft. long. Two legs, attached with screws so that they fold flat, support trellis at an angle of about 40 deg. Tie 15-in. plants to the rack

is not necessary if endive is grown to cook as greens.

Leeks: This plant is grown much in the same way as onions (see below), except that it is grown in trenches so the stems can be blanched. You can transplant leek seedlings when they are as thick as toothpicks. Cut the tops back and set the plants about half their length apart in rows spaced 10 to 12 in. apart. Fill the trench gradually with soil as the plants grow, ridging up the earth every two weeks when fall comes.

Lettuce: There are three general kinds of lettuce—head, loose-leaf and cos lettuce, or romaine. All require a rich, well-drained, lime soil with plenty of manure and nitrogenous fertilizer mixed in. Start early lettuce indoors or in a hotbed, at least four to eight weeks before it is transplanted outdoors. Later varieties can be sown as soon as the ground can be worked, placing the seed $\frac{1}{2}$ in. deep in rows from 14 to 16 in. apart. Keep thinning the plants until they have enough room in which to grow.

Onions: The many kinds of onions will grow in a wide variety of soil and climatic conditions, excepting extreme heat and cold. The soil should be fertile, moist and well tilled. An application of 1 lb. of manure to each square foot and 4 to 5 lbs. of 4-8-10 fertilizer per 100 sq. ft. will put the soil in good condition. You can start the onions from seed, seedlings or sets. Seed is cheaper than seedlings, but results from the latter are more certain. Onion sets are tiny onions grown in crowded rows ready for transplanting; they are the easiest to handle but do not come in all varieties. When seed is planted, sow thinly outdoors as early as the ground allows, $\frac{1}{2}$ in. deep in rows from 12 to 14 in. apart. Set seedlings 2 in. deep in rows with 3 in. between each plant. Plant sets 4 in. apart and 2 in. deep.

Parsnips: This slow-growing plant reaches edible perfection during the winter and should be planted when the weather and soil are warm so that it will mature in cool weather. It requires a light, loose soil mixed with well-rotted manure and commercial fertilizer. The seed should not be more than a year old and is sown rather thickly $\frac{1}{2}$ in. deep and in rows 18 in. apart. Thin plants until they stand about 4 in. apart.

Peas: Strictly a spring crop, peas should be planted as early as the ground can be worked, making two or three successive sowings at 10-day intervals. The bush types will mature in about 55 days, and the taller-growing kinds in 60 to 80 days. The tall-growing varieties will need a trellis or some support, while the dwarf kinds can either sprawl on the ground or be given some kind of support. Combine well-rotted manure and a 4-8-8 commercial fertilizer with a

good fertile soil for growing peas. You will need a pint of seed to plant a 100-ft. row. It should be sown from 2 to 3 in. deep at 1-in. intervals in rows which are 2½ to 3 ft. apart.

Peppers: Buying small plants from a grower rather than starting from seed is advised where the pepper is concerned. A dozen plants should be enough for the average family. If you would rather start them from seed, sow them under glass six to eight weeks before it is warm enough for outdoor planting. When all danger of frost is past, the plants can be set in the open in rows 2 ft. apart, leaving 18 in. between each plant. A moist, well-drained soil, which is not too rich but contains enough humus to make it light is required. In gathering the pepper pods, use a sharp knife or scissors rather than breaking them off, which may injure the plant.

Potatoes: If you have a large garden with suitable soil and the right kind of climate, you may want to grow your own potatoes. The suitable soil is a light, well-drained one containing plenty of well-rotted manure and commercial fertilizer. Plant seed potatoes which are well formed and of a good size. They should first be left out in the sun for about two or three weeks before planting. Then cut the potatoes in blocky pieces, each of which contains an eye or two, and plant them in rows. Plant the spring crop as early as the ground can be worked. A winter-storage crop can be added in late May or June. Prepare hoed furrows about 2 ft. apart and drop the seed pieces in them 10 in. apart and 4 in. deep. Hoe up the soil around the plants as they mature so they are upright and protected from the sun. See also Sweet Potatoes.

Pumpkins: If you want to plant pumpkins, you will have to do so late enough in the North to avoid spring frosts and early enough in the South to mature before the summer heat becomes extreme. Pumpkin vines grow in a sprawling manner, but space can be conserved by planting them in a patch of corn or to follow early potatoes. Sow 6 to 10 seeds in each hill, cover them with 2 in. of soil and leave about 5 to 8 ft. between the hills. Pull out all but the three largest plants.

Radishes: For a constant supply of mild, crisp radishes on the table, plant them at two-week intervals in a short row. They can also be grown between rows of slower-growing vegetables. If you plant radishes by themselves, sow the seed 1 in. apart in rows 8 in. apart. Radishes will grow in any loose, moist and fertile soil. The main thing is to keep them growing rapidly so they do not become woody. A complete fertilizer added to the soil at planting time is advisable for this crop.



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Companion planting gives you two crops from one row. Combine vegetables that grow quickly, such as radishes, with slow-growers like tomatoes or beans

Rhubarb: Here is a perennial which does best where summers are cool and moist and the ground freezes several inches deep in winter. Rhubarb will not grow in the South except in high altitudes. Prepare the soil to a depth of 12 in. and work in leaf mold, well-rotted manure, rotted sod or other organic matter to assure good drainage. The usual way to start rhubarb is from divisions of the crown of an established hill. Each piece should have at least one eye. Plant rhubarb in prepared hills which are 3 ft. apart, with the crowns 4 in. below the surface of the soil. All seed stalks should be removed as soon as they form so the plants will not be weakened. Rhubarb is to be harvested only during the spring and allowed to grow undisturbed during the summer.

Rutabagas: See Turnips.

Spinach: Start this quick-maturing, early plant as early in the spring as possible, sowing seed at weekly intervals. Spinach will not grow in hot weather, so give it a rest and start sowing again in August or September for fall use. The soil has to be well-drained, fertile, well supplied with moisture and on the limey side. Mix in 100 lbs. of manure and 3 to 4 lbs. of commercial fertilizer for each 100 sq. ft. before sowing the seed. Plant thinly, ½ in. deep and in rows 12 in. apart, thinning until the plants stand 4 in. apart.

Squash: There are two kinds of squash—summer and winter types. The soft-skin summer ones are the crookneck, the scallop, the acorn and the vegetable marrow. The Hubbard, delicious and Boston marrow are the hard-shelled winter kind. If

you have enough room, grow both kinds. If not, the summer sorts of the bush type are recommended over the winter squashes. Both types can be grown almost anywhere in the country in rich soil with plenty of organic matter. The bush kinds should be planted 1 in. deep in drills 4 ft. apart and thinned out until the plants are 15 in. apart. Plant the vine squashes 1 in. deep in hills or 2 ft. apart in drills, which are spaced 8 ft. apart.

Sweet potatoes: You can grow this vegetable in most regions where you can count on at least 150 days between frosts. But don't plant it unless you can spare a lot of room. Select a well-drained spot in full sunshine and plant in a moderately rich soil. You can start the sweet potato from young plants known as "slips" or "draws," or from roots. Hoe up the soil to form ridges 6 in. high and about 3 ft. apart. Set the plants on these ridges, pushing them in 3 in. deep and from 12 to 14 in. apart. Do not plant until the temperature has reached about 70 deg. Fahrenheit. Move the vines about every two weeks to prevent their taking root at the joints. When you harvest, choose a clear, bright day when the soil is dry. Dig up the vegetables and cure them in a warm, well-ventilated room for 10 days.

Tomatoes: If space permits, grow tomatoes from seed indoors, sowing five to seven weeks before the plants can be set outdoors. Sow the seed $\frac{1}{2}$ in. deep in the flat. When the second pair of true leaves is formed, transplant the seedlings into other flats leaving 4 in. between them, or set them in individual containers. After tomatoes are transplanted, grow them at a rather low temperature and with plenty of ventilation. If you buy plants from a dealer, select sturdy, stocky, dark-green ones. In setting the plants outdoors, choose a sunny, well-drained location. Avoid using too much manure or nitrogenous fertilizer. Bone meal, superphosphate and sulphate or muriate of soda should be used instead. If the plants are to be tied to a stake or trellis, you can set them 18 in. apart in rows 3 ft. apart. If you have lots of space, set the plants at 3-ft. intervals in rows 4 ft. apart and allow them to sprawl.

Turnips and rutabagas: Both of these are cool-weather crops which do better in the North than in the South. If you want to grow them in the South, do so in the fall, winter or spring and select the quicker-maturing varieties. For summer use, sow the seed in a moderately fertile soil in rows which are 12 to 15 in. apart. Thin the seedlings until they are 6 to 8 in. apart in the rows. Crops grown for fall use or winter storage are treated in the same way, except they can be allowed to grow longer, until the ground freezes.

Water cress: This plant can be grown from seed, but it is easier to start it from cuttings or bits of stem. Prepare a bed of well-rotted manure and sow the seed $\frac{1}{8}$ to $\frac{1}{4}$ in. deep in rows 18 in. apart. If cuttings are used, set them 4 in. apart in rows. Provide plenty of water for this plant, and if you have a wet spot near a spring or brook, all the better. Once water cress is established, it needs no further care and there will even be a good crop the first season.

Herbs

Anise: You can plant the seed of this annual herb as soon as spring becomes established. Choose a light, rich, well-drained loam and mix some lime into it. The seed should be planted $\frac{1}{2}$ in. deep in rows 12 in. apart, and the seedlings can be thinned out when they are 2 in. high and until they stand 6 in. apart. The plant will bloom by midsummer and provide the seed with which to flavor your food a month later.

Basil: To start basil, sow the seed indoors and thin the seedlings until they stand 2 or 3 in. apart. Set the plants outside when 6 in. high, planting at 12-in. intervals in rows 18 in. apart. Pick out a sunny position with deep, fertile, light soil. In harvesting basil, cut the foliage a few inches above the ground.

Chives: The culture of this plant is similar to that of onions (which see), except that chives are perennials and need to be treated accordingly. Plant the seed $\frac{1}{2}$ in. deep in rows 12 to 14 in. apart. When the clumps get too thick, dig them up and reset them. Do not allow the seed to ripen on the plant, as volunteer seedlings will soon become a nuisance in the garden.

Mint: This hardy perennial herb can be started from divisions of root stocks, cuttings or seed. Sow the seed in flats indoors and transplant in the open later or plant outside from the beginning. The root stocks should be set 6 to 12 in. apart, leaving 15 in. between rows. Mint roots spread considerably, so select a place for them where they do not crowd out other plants. The roots can be checked by pruning them or sinking small sheets of metal into the ground around the mint patch. Keep the plants cut.

Parsley: The seed of this plant is slow in germinating, so it should be soaked overnight. Sow the seed in a rich, mellow soil, planting it $\frac{1}{8}$ in. deep in rows 13 to 14 in. apart. Cover the newly sown row with a board for a few days and remove when the first seedlings appear. A daily watering is required to stimulate best growth. In the North it is best to give parsley an early start by sowing the seed indoors in flats or in a hotbed. If the winter is not too severely cold, a mulch over the parsley roots will protect the plants.



This pyramid-type strawberry bed holds 64 plants in a space 6 ft. square without crowding, and the weeding, watering and gathering of the fruit are simplified. Four frames built as in the detail are filled with soil to about 2 in. above the top to allow for settling and then are stacked in pyramid fashion.

Home-grown fruit ~~~

FEW HOME GARDENERS will have room for an extensive orchard. But there is such a thrill in growing your own fruits, even if only enough to grace a meal or two, that many will want to have some fruit-bearing trees or vines. There will be little difficulty in this if the fruits chosen are native to the region, and if ordinary planting precautions such as recommended for decorative trees and shrubs are followed. Fruit-bearing trees and shrubs do need careful pruning and sometimes require grafting. You may want to read about these special gardening tasks in Part 4, "Garden Maintenance."

Fruits which can be most easily grown in the home garden are discussed in the following paragraphs.

Apple: A single apple tree will bear more than enough apples for the average family. Pick a variety that suits the taste of your family, and plant as you would any deciduous tree (see page 66). Either fall or spring is seasonable for planting. Apple trees will grow in almost any kind of soil, but light sand or heavy clay will slow their growth. Once the trees begin to bear fruit, a light pruning will be required every fall. Watch for the development of diseases and insect pests, and take immediate steps to control them should they appear.

Blackberry vines should be planted from seedlings obtained from a good nursery. The plants are set about 4 ft. apart in a furrow about 4 in. deep. After planting, cut the shoots back to within 3 or 4 in. of ground level. The tops of the shoots should be pinched off when they have grown to 2 or 3 ft. This is important, as it forces the buds on the stems to shoot out and form lateral branches. Berries usually will form during the second growing season. During winter, the old canes should be cut off close to the ground.

Cherry trees, especially those bearing the sour variety of fruits, grow well and easily in the northern states. One standard tree will provide plenty of fruit for a family. If several varieties are preferred, there are dwarf stocks available which never become more than medium-sized bushes, but which bear heavy crops of excellent fruit. These are ideal for the small garden.

Currant bushes are a good addition to the garden. They make ideal boundaries for a vegetable plot. Red currants are the most satisfactory variety. Black currants are host to disease, and the white varieties have a peculiar flavor that is not widely liked. Currants are easily grown in cool, moist climates. Well-drained clay loam makes the best soil for them. One or two-year old plants are set out in rows about 5 ft. apart. Weed and cultivate thoroughly for the first two growing seasons. Currants will bear during the second year.

Gooseberries are hardy fruit, growing well into Canada. Although the bushes blossom very early in spring, frost does not easily injure them. Their location should be in clay or loam soil in a spot which has partial shade. The bushes are set out in trenches about 6 ft. apart. Thin the shoots each year to two or three of the sturdiest ones on each plant. This practice will insure large, tasty berries. Gooseberries are considered a tart fruit, but this is because they are usually picked before fully ripened. When allowed to become completely ripe on the bushes, they are sweet enough to eat as dessert fruit. The green berries are excellent in pies and tarts, and also make excellent jams and jellies.

Grapes, found growing wild along the shores of North America by early Norsemen, have been a home-garden favorite for many years. All of the more than 25 varieties will grow in almost any kind of soil. Once established, a grape vine will continue to bear fruit as long as 50 years. They are also very resistant to disease and insects. Select one or two-year-old vines, and plant them where they will get plenty of sunlight. Set the plants in a 4-in. trench about 8 ft. apart. Cut the vines back after planting, and cultivate the bed for the first

season. To protect the fruit from birds, cover the vines with mosquito netting before the fruit begins to ripen.

Pear trees come in standard and dwarf varieties. Heavy loam or clay that is well-drained is the best soil. Remember that some varieties are self-sterile, which means that they must be planted near other pear trees to bear fruit. These, therefore, must be avoided if a single tree is to be planted. Ask your nursery for an unsterile variety for a single planting.

Plums are possible all season long if you buy nursery-developed varieties which bear early, midseason and late fruits.

Peaches grow almost anywhere in North America, failing only where winter temperatures fall well below the zero mark regularly. They grow and bear quickly, and continue to have fruit for as long as 30 years. Peach trees grow best on soil that is sandy, gravelly, or even stony. Good drainage is important, for the trees cannot stand too much water. On the other hand, peach trees survive dry spells exceptionally well. Do not attempt to start peach trees in grass. Dig up the ground for 3 ft. around the base of the young trees, and keep it cultivated cleanly for several seasons. Cut the branches back sharply at planting time. After the branches bear fruit, the peach requires much more severe pruning than other fruit trees. The fruit is so heavy that branches break down if allowed to develop at will. Larger and better fruit can be grown if the green peaches are thinned out to about 6 in. apart on the branches.

Plum trees are planted and cared for as recommended for the apple. Trees one year

old when planted should bear within two or three seasons and continue to provide fruit for 30 to 40 years. The trees are hardy and the fruit disease-resistant.

Quince trees were prized in the old-fashioned garden not only for their fruit, but also for their lovely late-spring blossoms and their quaint, rugged shapes. Quince trees do not require rich soil; in fact the fruit is better if the tree is kept short and stocky by adverse soil conditions. The location must be well drained, however. Since the quince flowers later than most fruit trees, the blossoms are seldom killed by frost, and a full crop of fruit almost always appears. While the fruit is inedible raw, it makes excellent jams, jellies and preserves, either alone or in combination with other fruits such as pears and apples. For more information about the quince, see page 91.

Raspberries may be cultivated easily anywhere in temperate climates. Planting the vines in hills about 5 ft. apart is recommended. Pinch back the shoots after they have grown to 2 or 3 ft. in order to make the vines sturdy and stocky. Their energy will thus be diverted to fruit-bearing rather than to the ungainly growth seen in wild varieties. The old canes should be destroyed each fall; new ones will replace them the following growing season. Red, black and purple raspberries are the kinds most commonly grown in home gardens for tasty fruit.

Strawberry plants will thrive anywhere from Florida to Alaska if given proper care. They will bear well in almost any kind of soil that will grow ordinary vegetables. They do require a location that has good drainage; a sloping spot is therefore to be preferred. When buying strawberry plants, remember that you must have both those which bear staminate, or bi-sexual flowers, and those which bear pistillate, or female flowers. Such cross-pollination is necessary if the bed is to continue to produce season after season. A good ratio is about one staminate plant to every four pistillate plants. In nursery catalogues, the staminate plants are usually listed as "perfect," while the pistillates are labeled "imperfect." The strawberry plants may be set in rows 2 ft. apart or planted in hills from 15 to 18 in. apart. Strawberries may also be grown in boxed pyramid beds as illustrated on the opposite page. Be careful that the plants are set in with the crowns just level with the surface. If planted too deeply, the shoots will become stunted, or decay in very moist weather, while they will dry out if set too high. Strawberries need plenty of cultivation. Be careful, however, not to cultivate too close to the plants, since they are very easily uprooted.



A carpenter's apron with pint fruit jars inserted in each pocket makes berrypicking with both hands possible. This is surprisingly faster and easier.

Part 4

Garden maintenance...

GARDEN FAILURES often follow the most careful planting and cultivation. Such failures usually arise from a lack of knowledge of good garden maintenance. There will be times when you'll need to know how to get rid of insect pests, or how to treat a diseased plant. If your trees and shrubs are to achieve their maximum beauty, you will want to know a little about pruning. There will be times when the fundamentals of grafting will prove helpful. These are topics of this section.



H. Armstrong Roberts

Ridding your garden

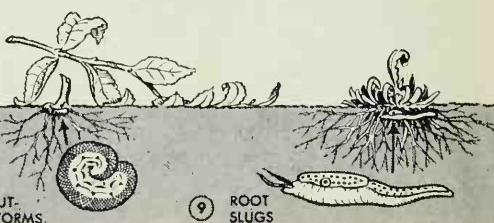
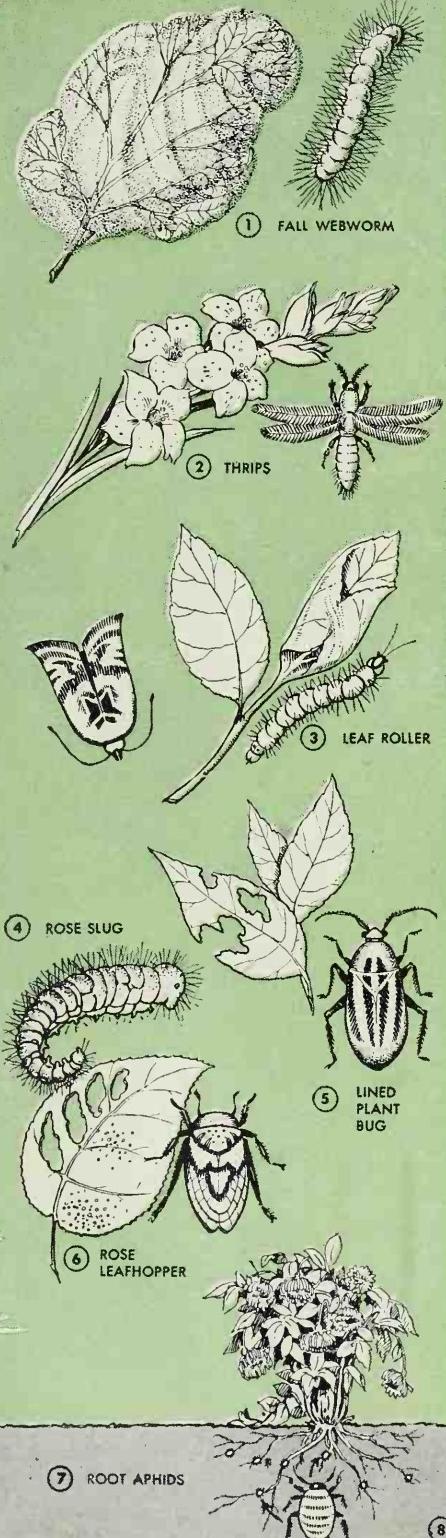
IF YOU SUDDENLY find your seedlings, transplants or carefully nurtured perennials wilting, drooping or dying despite all the approved cultural methods you've practiced, the trouble is likely to be bugs. Worst of all, you don't always know just when or where the pests are going to strike. That's why it's a good idea to keep a "loaded" sprayer or duster handy, just in case.

For the vegetable garden, one of the most efficient insecticides at present is that containing rotenone and pyrethrum in combination. Used either as a spray or dust, it kills the common sucking and chewing insects and is relatively nonpoisonous. In a general way, dusting is as effective as spraying in the vegetable garden and it requires less expensive equipment.

Fig. 19 shows the three positions of the spray nozzle necessary to cover both the top and underside of the leaves. Figs. 18 and 29 show sprayers suitable for use in the average garden. Figs. 30 and 31 show three types of dusters. The small hand types, Fig. 30, are suitable where only a few plants or shrubs are to be treated. The larger "knap-sack" type, Fig. 31, is better for larger areas, as it delivers a greater volume of dust and gives better coverage.

Listed below are the principal insect enemies of the garden. There are many others, of course, but they are not so bothersome. The recommendations given for the proportions of sprays and dusts to be used are only general. As the proportion to be used differs according to locality, check with your state agricultural station for the best use of insecticides in your area. Where manufacturer's directions differ from those given below, follow the maker's recommendations in every case.

Fall webworm, Fig. 1: Ties a silken web around leaf clusters on which the worms feed. Attacks shrubs, fruit and shade trees. Control measures: (1) cut off and burn webs, destroying every worm; (2) spray foliage with lead arsenate at intervals, a general recommendation for the solution being 1 to 3 level tablespoonsfuls to a gallon of water. Garden and parsnip webworms are less destructive and can be controlled by dusting with calcium arsenate.



of insect pests

Thrips, Fig. 2: Minute fly-like insects, less than $\frac{1}{8}$ in. long. Larvae of gladiolus thrips winter on the corms. Store corms in sealed paper bags containing naphthalene flakes, 1 oz. of flakes to 100 corms. During the growing season spray foliage with a 1 to 200 dilution of pyrethrum or with a solution of Paris green, 1 rounded tablespoon, brown sugar, 2 lbs., and water, 3 gals.

Leaf roller, Fig. 3: Three common varieties—oblique-banded fruit-tree roller, red-banded roller and strawberry-leaf roller. Watch for them on fruit trees and strawberry plants and spray early with lead arsenate to catch worms at the first infestation.

Rose slug, Fig. 4: Larvae of rose sawflies. Slugs skeletonize leaves as shown. Control with a dust composed of fine dusting sulphur, 9 parts, and arsenate of lead, 1 part; a 3-in-1 copper spray, or nicotine sulphate, 1 teaspoonful to 1 gal. water and 1 oz. soap.

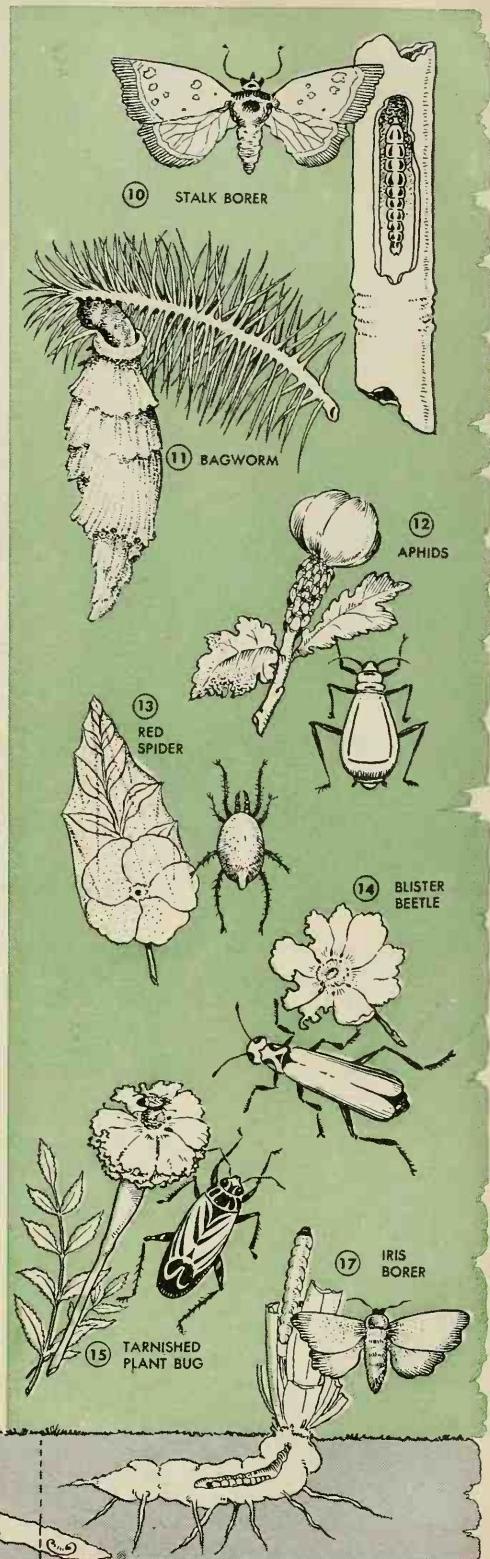
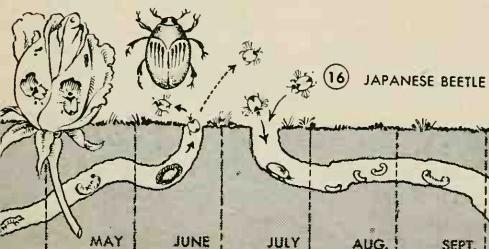
Lined plant bug or squash beetle, Fig. 5: Active, destructive pest which attacks common flowers. Also skeletonizes leaves of squash, cucumber and melon vines. Cover the vines and leaves with dust containing rotenone.

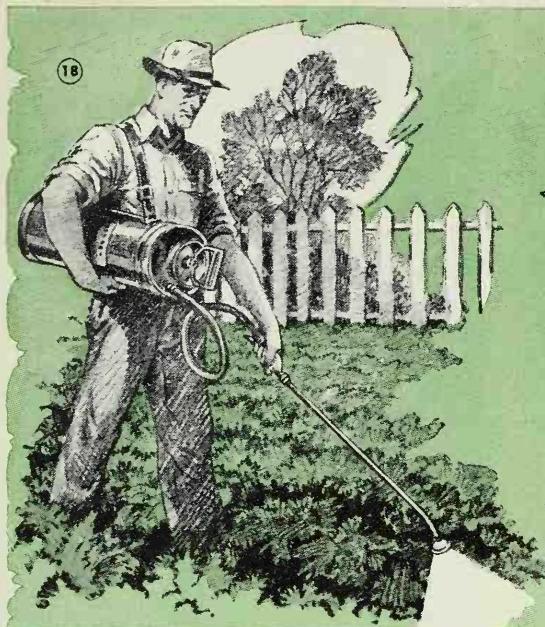
Rose leafhopper, Fig. 6: A tiny sucking insect attacking nearly all varieties of roses. Spray with nicotine sulphate and soap in proportions given for rose slug, or use spray containing pyrethrum.

Root aphid or root louse, Fig. 7: Attacks roots of asters principally. Mix wood ashes with soil when setting out seedlings. Pour nicotine-sulphate solution or carbon bisulphide around base of plants, covering root area. Keep in mind that carbon bisulphide is inflammable, and do not inhale the fumes.

Cutworm, Fig. 8: Lops off tender seedlings at ground level. Scatter mixture of white arsenic, 1 oz., dry bran, 1 lb., and molasses, 2 tablespoonsfuls in 1 qt. water. To protect birds place the bait under wide boards laid in line and close to the plants.

Root slug, Fig. 9: Bothers young delphiniums. Spread air-slaked lime, tobacco dust, soot or wood ashes around the plants. Mix lightly into the topsoil. Dust slices of raw potato with Paris green and place near plants.

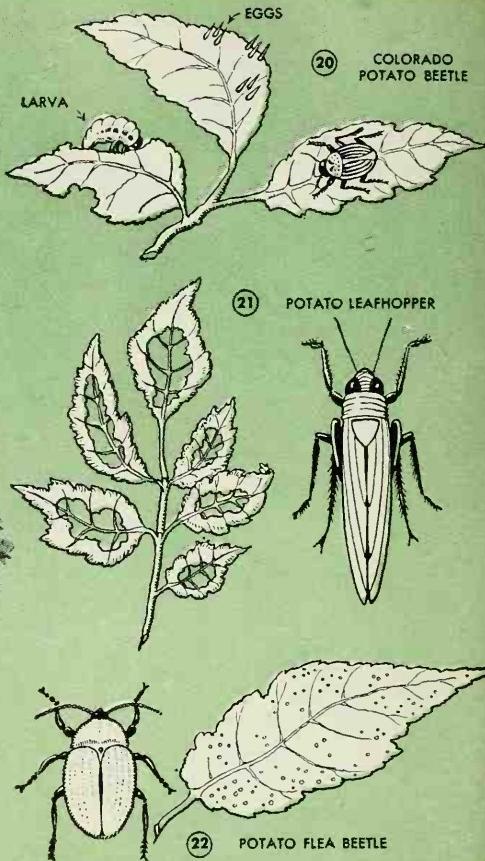




18

19

NOZZLE POSITIONS



Stalk borer, Fig. 10: This pest causes plants to wilt and topple over before its presence is known. The common native borer works into stems of any plants large enough to shelter it. There is only one yearly generation of "hatch." But the European borer, or corn borer, produces a second and sometimes a third generation in a single season. The corn borer also attacks dahlias, zinnias, garden sunflowers, potatoes, gladioli and other plants. At present control methods are mostly preventive—burning or plowing under infested growth and any stalks or trash in which the pest winters. During growing season the borers can be killed in individual plants by slitting the stalk just above the point where the borer entered and injecting a few drops of carbon bisulphide or nicotine sulphate. Tall plants so treated must be supported with a stake or by other means.

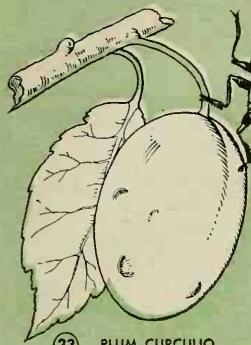
Bagworm, Fig. 11: Destructive shrub and shade-tree pest in certain sections of the United States, and a special enemy of evergreens. Gather and burn the conspicuous "bags" and spray infested growth with lead

arsenate during spring and summer months when larvae appear.

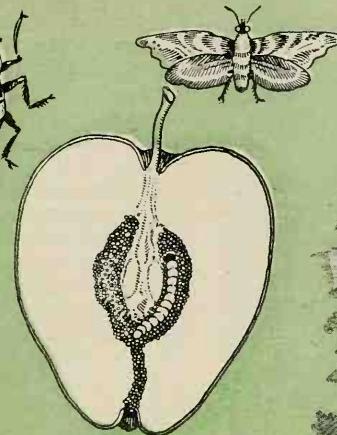
Aphid, or plant louse, Fig. 12: Aphids attack almost any garden or greenhouse crop. Heavy infestations are serious, as the lice are carriers for many plant diseases. Pyrethrum-rotenone compounds used as spray or dust and nicotine sulphate-and-soap sprays are effective on practically all growth.

Red spider, Fig. 13: This is not really a spider but a tiny mite weaving almost invisible spiderlike webs on the underside of leaves of vegetables, ornamental plants and evergreens. Hosing evergreens with water under high pressure discourages the pest, but a better method is dusting with fine dusting sulphur, covering the growth thoroughly. Pyrethrum-rotenone sprays or dusts are effective on other plant growth, but the spray or dust must hit the undersides of the leaves as well as the tops.

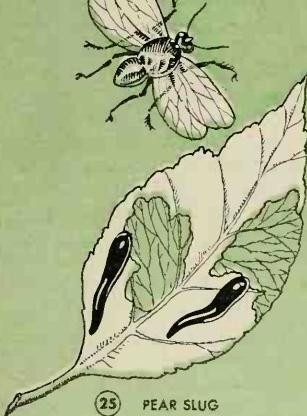
Blister beetle, Fig. 14: Slim-bodied, lively beetles about $\frac{3}{4}$ in. long. Voracious feeders on foliage of vegetable, flower and field plants. Spray foliage with lead-arsenate



23 PLUM CURCULIO



24 CODLING MOTH



25 PEAR SLUG



26 CORN EAR WORM



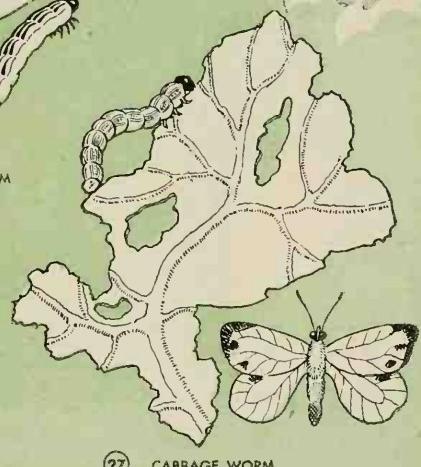
solution. Where flowers are infested, knock the beetles out of the blooms into a pan containing kerosene.

Tarnished plant bug, Fig. 15: An active, brown-mottled bug about $\frac{1}{4}$ in. long. Feeding habits cause wilting and blackening of leaves and twigs. Difficult to control ordinarily, but pyrethrum sprays or dusts generally are sufficiently effective to permit near-normal growth of most plants.

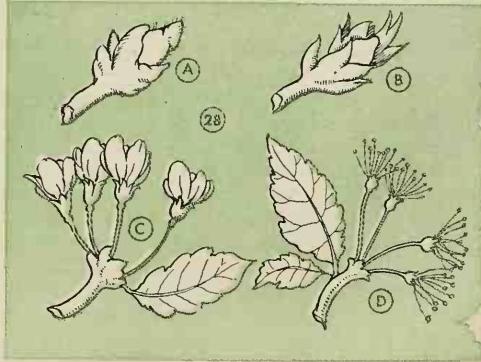
Japanese beetle, Fig. 16: A serious, spreading pest, against which soils can be inoculated with spores of a disease fatal to its larvae. Dry lime applied thickly to foliage is an effective repellent of the adult beetles. Valuable sod can be protected from ravages of the larvae by spreading 5 to 7 lbs. of lead arsenate over each 1000 sq. ft.

Iris borer, Fig. 17: Before growth starts cover beds with straw or dry trash and burn to destroy the eggs. Always keep the fire hazard in mind when burning beds. Spray new growth with arsenate of lead.

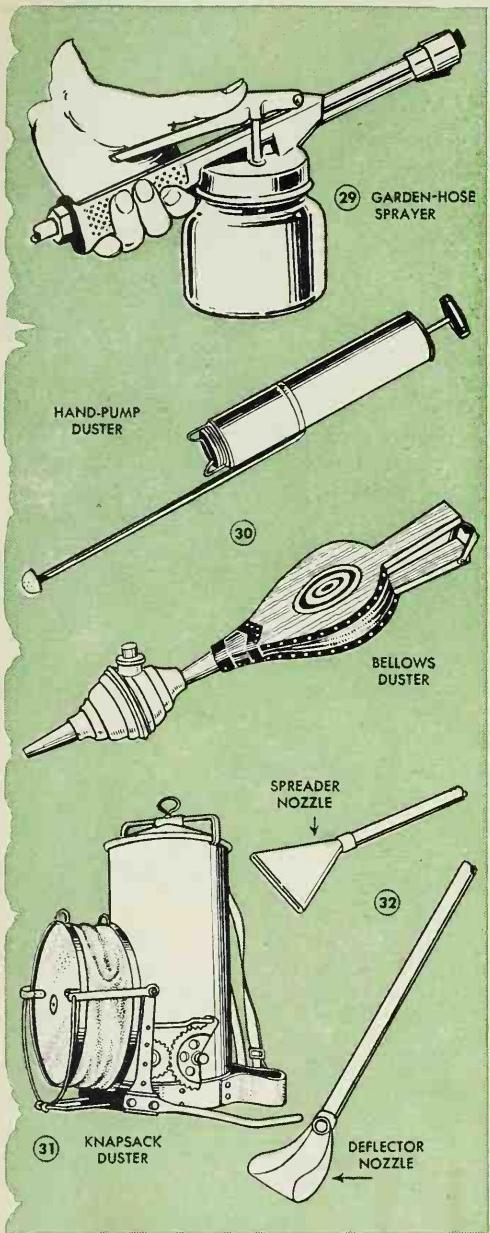
Colorado potato beetle, Fig. 20: Most common insect damaging potatoes. Spray or dust foliage with arsenate of lead, cal-



27 CABBAGE WORM



28



cium arsenate or any other potato spray.

Potato leafhopper, Fig. 21: Generally light green in color and $\frac{1}{8}$ in. long, this is one of the most serious potato pests. Causes foliage to curl at the edges and become dry and brittle. On small plots use a prepared Bordeaux mixture or a prepared potato spray.

Potato flea beetle, Fig. 22: Tiny black beetle a little larger than a pinhead. Eats small round holes in the leaves. Bordeaux mixture is a good repellent, but must be

applied early when the plants are 3 to 6 in. high. Plants should be sprayed at least five times at intervals of two weeks or oftener during the growing season.

Plum curculio, Fig. 23: Cuts crescent-shaped marks on fruit. Spray with lead arsenate just after the petals fall. Repeat in a week to 10 days.

Codling moth, Fig. 24: This is the cause of wormy apples, pears, crabapples, quince and black and English walnuts. An effective spray is lead arsenate. To be effective this spray must be carefully timed and used in combination with other spray materials. The first spray should be given when the fruit buds appear as at A in Fig. 28 and must end before the leaves are $\frac{1}{4}$ in. long, B in Fig. 28. For this spray mix concentrated lime-sulphur, 1 gal. and nicotine sulphate, 5 tablespoonfuls, 40 percent solution, in 10 gals. water. For the "pink-bud spray," C in Fig. 28, use lime-sulphur, 1 qt., and lead arsenate, $1\frac{1}{4}$ cups, in 10 gals. water. For the petal fall, or calyx spray, use lime-sulphur, $1\frac{1}{2}$ pints and lead arsenate, $1\frac{1}{4}$ cups. Repeat calyx spray after 10 days and again 3 to 4 weeks after petals fall.

Pear slug, Fig. 25: Spray with nicotine sulphate or arsenate of lead, making sure that spray covers both sides of leaves.

Corn ear worm, Fig. 26: Attacks when ears are in the silk. Dust silks with a mixture of hydrated lime, 1 part, to lead arsenate, 2 parts, beginning when the silks first show and continuing at intervals. Or use corn ear worm insecticide when the silks start to turn brown.

Cabbage worm, Fig. 27: Riddles the first leaves of cabbage and cauliflower and later attacks outer leaves of formed cabbage heads. Use a combination pyrethrum-rotene dust. In heavy infestations, keep the growth covered at all times.

Garden insect pests are generally of two kinds—sucking and chewing, the terms referring to the manner of feeding. The damage caused by common chewers shows up quickly and usually the offenders are discovered easily and put out of business. But certain of the sucking insects work less openly and are so tiny that they are not discovered by a casual examination. Moreover, they can generally be destroyed only by bringing the sprays or dusts in contact with their bodies. Against certain other spreading pests only preventive methods are used at present, although these insects will probably be brought under a measure of control by newly developed sprays and dusts now used experimentally. Of course, manufacturers do not market these new products until they know what they will do, hence most of the old stand-by sprays and dusts still are recommended. And many of these are being improved.

Your plants can have diseases

AS IN A HUMAN BEING, disease in plants is simply a change from a normal condition. This condition is brought about by injury to the plant, poor growing conditions or by disease-carrying insects.

Disease caused by growing conditions can mean drought, too much moisture, shortage of right foods and improper soil contents. And the temperature can be either too hot or too cold.

Tinier than any insect are the parasites that live in the plants, constantly drawing off nourishment. This action causes bacteria, slime molds and fungi.

Virus diseases are the most baffling enemies because they cannot be discovered until they have already done the damage. In the human being, virus diseases cause sleeping sickness and infantile paralysis. In the plant, virus diseases are recognized by spotted marks on the foliage or by a yellowing and shrinking of the plant. It is necessary for the gardener to recognize a plant disease and to select and use the proper cure to save the plant. If this is not possible, the gardener may cut a piece of infected plant and send it to an experimental station.

Plant disease is nothing new. Some of the present-day troubles go back to the earliest records of man. Now, the spread of plant disease keeps up with the fast pace of transportation. Disease-producing organisms are shipped in or on seed, tubers, nursery stock, soil and plant debris. Nature also does her bit by shipping via air and water currents, birds and insects.

Gardeners themselves are unknowingly responsible for spreading disease around

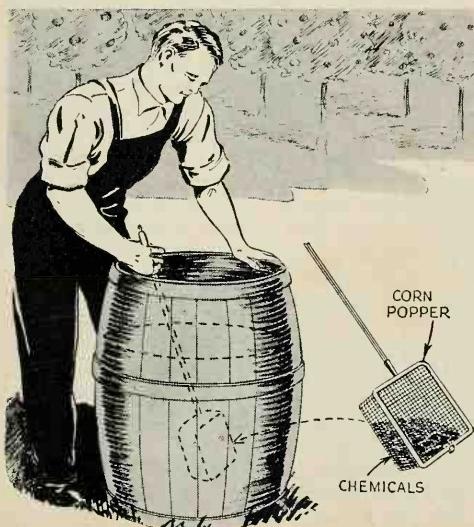
their own and their neighbor's yard. Always take care when working with diseased plants. If you cut off a blighted plant bud covered with infection, do not carry it openly around the garden on the way to the rubbish pile. Put it under cover at once. If you pull up a slimy, diseased iris plant, do not touch a healthy one until you have washed your hands. Do not separate roots to divide with your neighbor without checking for any possible infection of the plant. Tools must be cleaned after using on the diseased plant.

Don't wait until disease has weakened your plants before attempting a cure. Many common garden plants are subject to mold, mildew and rust. These diseases can be controlled by dusting the plants several times each month. Use a duster that will send a cloud of insecticide upwards as well as downwards.

A nicotine spray applied often will prevent plant lice from forming and doing damage. The plant lice pierce the sharp stylets of their beaks into the plants cells and draw out the sap. This causes the plant to lose vitality. Disease then shows up in various ways—discoloration of foliage, curling of leaves and blighting of buds and fruits. Plant lice carry diseases from one plant to another. The most serious of these diseases are fire blight and mosaic.

There are several ways to control plant diseases. The four general methods are:

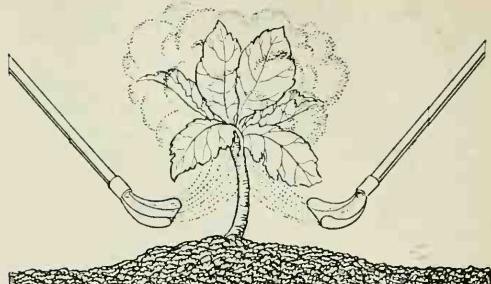
- (1) Keep infection out of a disease-free area by disinfecting seeds or plant parts before planting.
- (2) Remove all parts of plants that are



A plant duster can be made by punching a series of holes in the lid and around the rim of an ordinary friction-lid can of 1-qt. size. Fill with dusting powder within 2 or 3 in. of the top and shake outward, assuring good coverage of foliage. Be sure that lid is on tight and will not come off when the can is shaken vigorously



You can make some solutions to treat plant diseases by dissolving chemicals in water. One handy and time-saving way of doing this is shown in the drawing at the left. Put the chemicals in a discarded corn popper and swish them back and forth in the liquid. In this way, chemicals are dissolved more rapidly than when dumped into the water and stirred with a paddle



In spraying a plant to counteract a disease, be sure that you also spray from beneath, as above. It is important that diseased plants be thoroughly covered

To assure better coverage of plants and to avoid waste of dusting materials, fit a paper cone to the nozzle of the dusting gun as shown at the left. Make the cone large enough to fit part way down over the plant so the dust is confined and will not spread in the wind

infected. Spray with a 1-7 lime-sulphur solution to preserve rest of plants that are healthy.

- (3) Spray and dust with solutions recommended by the florist or nurseryman to keep disease from starting. Soil can be disinfected, but care must be taken not to kill all bacteria. Some bacteria are helpful. If organic life is missing, then the soil is infertile.
- (4) Select and develop new plants that are immune to contagious diseases.

It is a good idea for the home gardener to know a few of the common symptoms and signs regarding special diseases. He will understand just what information he will need to ask for certain instructions. Some of the most common symptoms are:

Scorch: Discoloring and death of large areas of leaves or fruits, due to drought, heat or spray injury.

Blight: Sudden dying of shoots, foliage or blossoms, caused by a disease-producing organism.

Spot: An oval dead area developed in leaves or fruit. The infected areas are usually brown in the center, but often surrounded by red or yellow zones.

Die-back: The twigs and branches of trees and shrubs die backward from the tip. This condition can be also caused by winter injury or wet soil.

Canker: Sunken cuts or lesions in stems, branches, trunks or roots of trees or shrubs. These are open wounds and must be cared for at once.

Rot: This condition is dead tissue in an advanced stage and is caused by disease bacteria. Rots may be soft, hard, dry or wet.

Damping off: The rapid rotting at the

base, or wilting of seedlings. This condition may happen at such a young stage that the plants do not even come up from the soil. There are several remedies on the market for this disease. Formaldehyde dust or zinc oxide may be applied to soil as a treatment to control above-ground damping off.

Wilt: The clogging or poisoning of the system of a plant, resulting in drooping or die-back and usually the death of the entire plant.

There are no protective measures known to fight the virus diseases of plants. The important precaution against them and their spread is to remove all diseased plants. Virus diseases are easily transmitted from infected plants to healthy ones. It can be done in some cases by merely touching the plant. A few are sent through the seed, others through grafting and some by insects as their chief carriers.

Symptoms of virus diseases are:

Stunting: A reduction in size.

Curl: Abnormal bending, curling or crinkling of leaves due to overdevelopment of one side.

Scab: Usually this disease appears like a circular raised bruise on fruits, tubers, stems and leaves.

Swelling: The action of bacteria causes the woody portions of plants to swell.

Callus: This is the soft tissue that forms over any wounded or cut surface of a stem.

Chlorosis: Lack of sufficient green coloring in a plant.

Mosaic: This usually takes on a cloudy or blotchy effect on stems and leaves as in many kinds of marble.

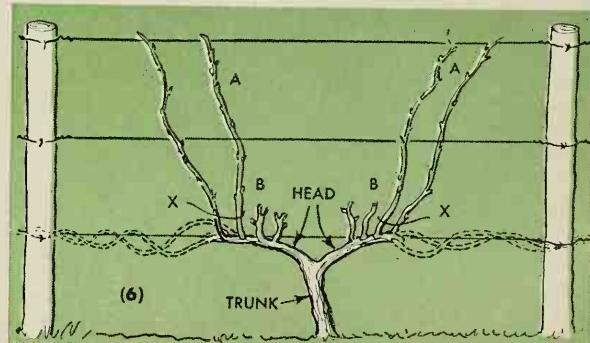
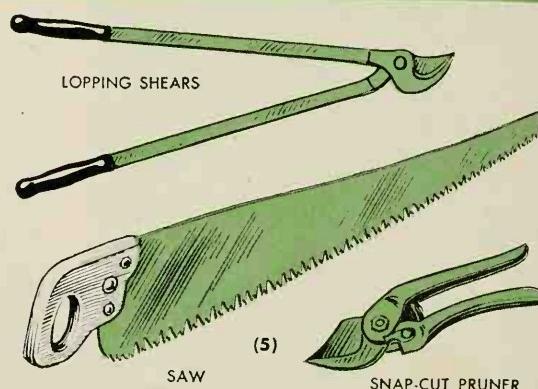
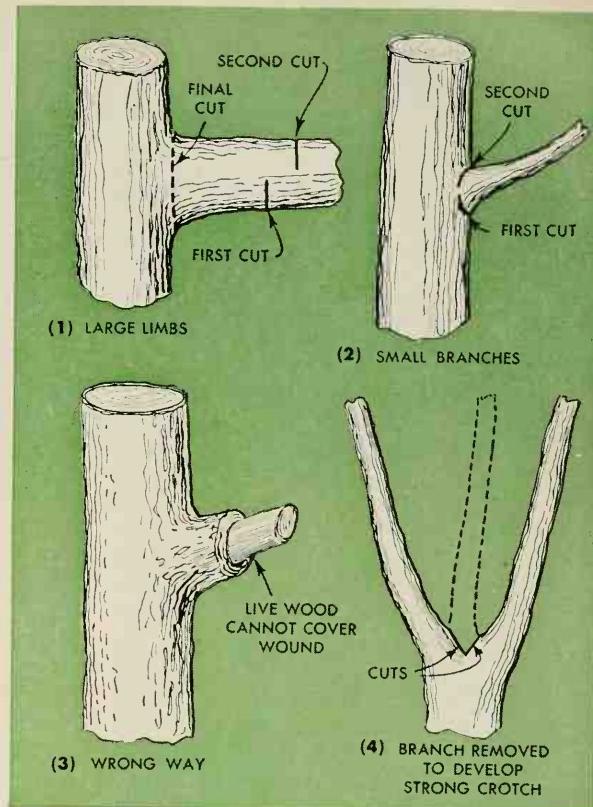
Rosetting: This condition is the shrinking of certain sections of the stems. The foliage is forced and crowded into a small cluster resembling a rosette.

Pruning

PRUNING trees or shrubs is more than merely cutting off a few limbs or twigs here and there. Knowing what to take out and what to leave is the important thing, and this requires a careful study of each individual plant, taking into account its age, species and location. The time to prune varies with the locality. Some trees and shrubs can be pruned at almost any season while others will suffer extensive damage unless you do the job at precisely the right time. Experienced gardeners and orchardists say that dormant pruning is done best during January, February and March, but that the later it can be done during the dormant season the better, as the wounds will heal more quickly.

Except for formal treatment, the natural shape of the tree should be given every consideration. Each type has a typical form and pruning should emphasize this. The elm, for example, generally has a loose-growing vase shape; the Norway maple has a dense oval and almost formal one, and the pin oak has a pyramid shape with horizontal branching. Any tree will attempt to regain its normal form, regardless of trimming done to change it.

Most shade trees require relatively little pruning. Removal of dead, interfering and injured branches usually is all that is needed. All cuts should be made with a sharp saw as close to the crotch as possible and parallel with the adjoining trunk or branch. Leaving even a short stub will make proper healing of the cut difficult or impossible and may result in decay. Fig. 3 illustrates an incorrect cut where a stub has been left. Note that the live wood has been unable to cover the end and has receded, leaving a projection of dead wood which is ideal for decay. On smaller branches, the first cut should be made part way up from the bottom and then the second cut made from the top down, Fig. 2. If the cuts are not made in this manner, a tear that is very difficult to heal may result. Larger branches should be given even



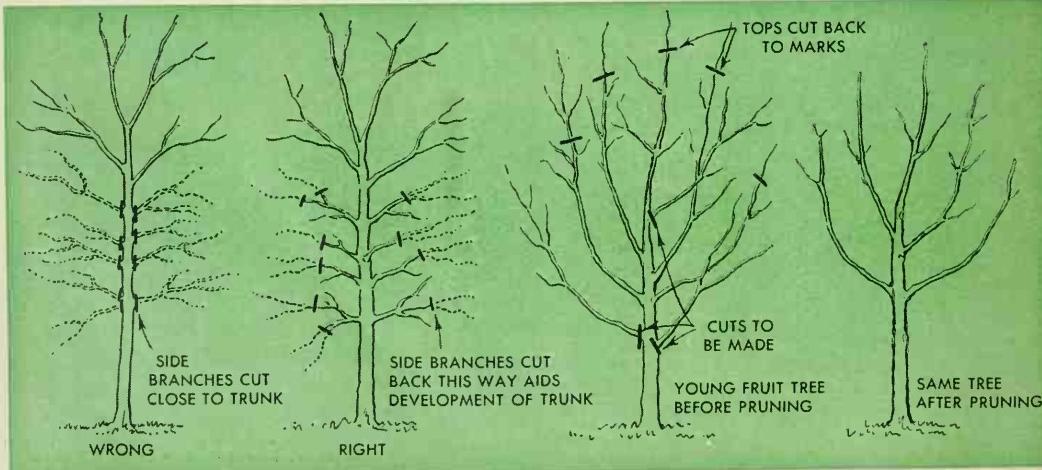


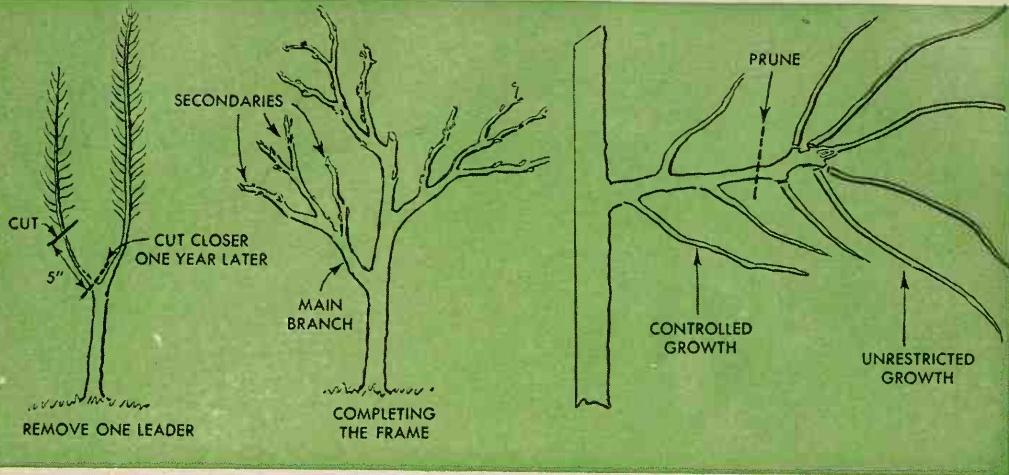
Saw branches off as close to the trunk as possible (above), and scrape away any jagged edges (below)



more care. A safe policy to follow is the one shown in Fig. 1. The first and second cuts are made as indicated to drop the limb, and the final cut, which is made from the bottom and the top, is to remove the stub. Very small branches are trimmed with a snap-cut pruner, Fig. 5. Any jagged edges should be shaved off and the wound painted thoroughly with tree paint. Painting seals the cut and prevents moisture and decay from setting in before live wood covers the wound. Larger cuts should be painted each year because the cut portion may have a tendency to dry and crack. Some of the lower and inner branches of a tree usually die each year due to lack of sunshine. Also, some trees have a tendency to produce more branches than the roots can support and the weaker ones die off. These dead and dying branches should be removed regularly.

Frequently a tree will be found to possess a number of interfering branches which endanger the health of others by causing a crowded condition. Parallel branches too close together fall in this class also. Keep parallel branches at least a foot apart, and in removing interfering branches, study the over-all arrangement to maintain good balance. Worn spots caused by rubbing branches are likely to develop decay which may, in time, spread to other portions. Rubbing is due frequently to crowded or parallel branches that are too close together. One should be removed to allow more freedom. Another point of interference is at a crotch. Fig. 4 illustrates a poor crotch caused by three branches coming out at the same point, forming sharp angles. Removal of the middle branch allows room for the others to spread without crowding. When a branch is torn off by wind, ice or snow, a jagged wound often results. Such an area should be cleaned until



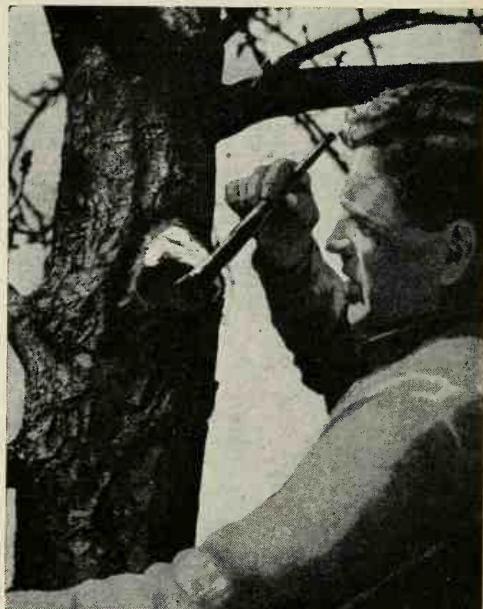


only firm wood is left and then painted. This may require lengthening the gash considerably, but that is better than leaving rough, frayed portions that will collect moisture. Paint for several consecutive seasons until the wound heals.

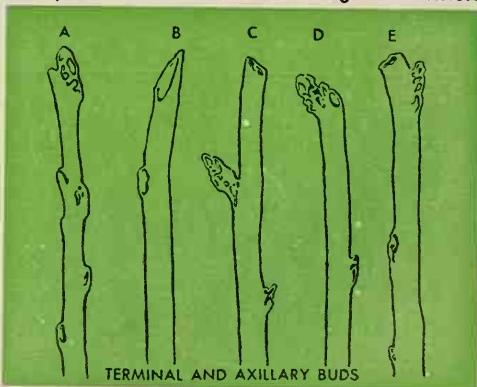
It's important to prune young trees because faulty branching can be corrected while the limbs are small. A good main crotching arrangement can be trained either high or low, depending on the tree's location. Street trees should be high so they will not interfere with traffic. Most lawn trees in city and suburban areas also should be "headed up" to permit circulation of air through the yard and to allow sunshine on the lawn. Where space is not at a premium, low trees add to the appearance of the yard. When training young trees, the side branches are sometimes completely removed up to the desired height, which makes the trunk weak.

When pruning, the location of the cut in relation to the buds is important. Detail A in the diagram on this page shows an unpruned branch. The terminal bud is at the tip with cluster buds at the base; farther down are axillary buds, which may be found in pairs. In detail B the cut is long and slanting, causing the wound to dry too slowly. Detail C shows a cut too far ahead of the bud and the stub may rot. The cut is too close to the bud in detail D and it may dry and drop off. The correct way is shown in detail E where the cut has a slight slant and is about $\frac{1}{4}$ in. above the bud.

If young trees have been planted, during the third year, or the second year if two-year trees were planted, treat each main branch as though it were an individual tree, except that the buds on it are not spaced around the branch, but should lie fanwise and parallel with the ground. This cutting forces the weaker buds below the cut to



The pruning wound should be painted thoroughly with tree paint, which seals the cut against moisture



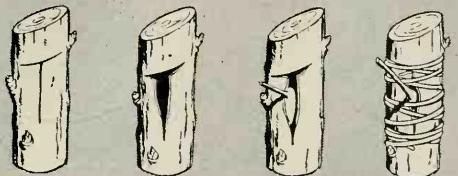
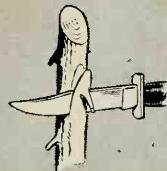
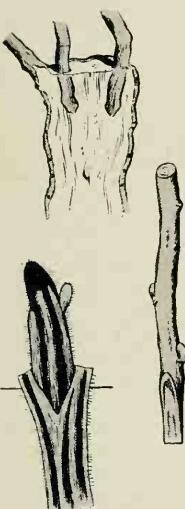
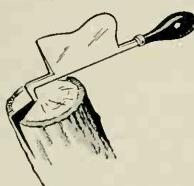


Small branches may be trimmed with a hand pruner (above), or with a pole pruner as below. A pruning pole can be equipped with a pulley and rope as indicated below to greatly increase the leverage. A pulley is attached to the cutting-head arm. The rope is passed through the pulley and fastened to a screw mounted on the pole about a foot or so from the top

grow and form a well-knit frame. A newly planted tree, if it has developed two leaders, should have one cut back close to the trunk.

Fruit trees require a treatment slightly different from shade trees, although the method of pruning and the tools used are the same. Young fruit trees just being planted should be pruned to develop proper crotching and branching. The leader and three or four of the side branches should be retained. Both the leader and the remaining side branches should be cut back so the leader is 4 to 6 in. longer. When fruit trees begin to bear, their annual growth generally lessens because of the strength required to develop fruit. As a rule-of-thumb, the need for pruning is limited usually to the removal of dead, interfering, diseased or damaged branches. There is one type of branch found on fruit trees that is not often encountered elsewhere. Sometimes this is called a "sucker" or "water" branch and will not bear fruit, but due to its rapid growth it will have a tendency to sap the strength from other branches. Most of these spring from the main branches and grow in an upright position. This type of growth should be removed as soon as it develops.

Grape vines: Among the several systems used for pruning grape vines, the one illustrated in Fig. 6 is widely chosen because it is simple and produces renewal canes that are close to the head. During the latter part of each winter, but not when the vines are frozen, leave two or more long canes, AA, having five to ten buds each, and cut a similar number of canes, BB, back to spurs having one or two buds each. Then cut away all other growth. In effect, the long canes will produce shoots on which grow the following summer's crop, while the short canes become renewals that will bear the crop of the second summer. Early in spring, bring the long canes down and tie them as indicated by the dotted lines. Later reduce each short cane to a single strong shoot and tie to the upper supports. This process is repeated each season. When selecting renewals always select those as close to the head as possible. In many cases these may be coming from the trunk. The total number of buds that the long canes will carry depends upon the soil, vigor of the plant and similar factors. When well established, the popular Concord grapes can carry 50 to 60 buds to a vine, whereas less vigorous varieties should be held to a maximum of 25 to 30 buds to obtain the best yield. Like trimming trees, this type of work requires only a few simple tools. Lopping shears and a snap-cut pruner are all that are required to do the job in most cases.

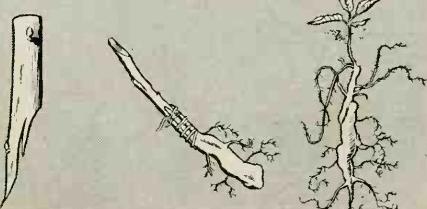
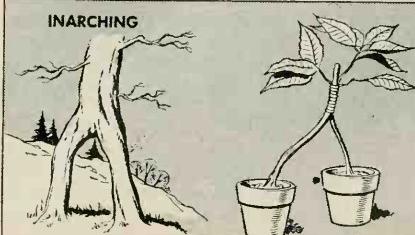
BUD GRAFTING**CLEFT GRAFTING**

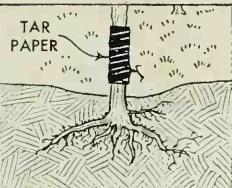
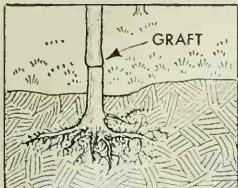
Grafting trees and shrubs

THE SCIENCE OF GRAFTING is complex, and in its fullest application is beyond the interest and the needs of the average home gardener. Few will want to grow seven varieties of apples on one tree, or combine a quince and a pear to produce a dwarf pear tree, or to try to cross grapes and roses. Nevertheless, every gardener should know the general principles of grafting in order that he may keep his trees, shrubs and other woody plants healthy.

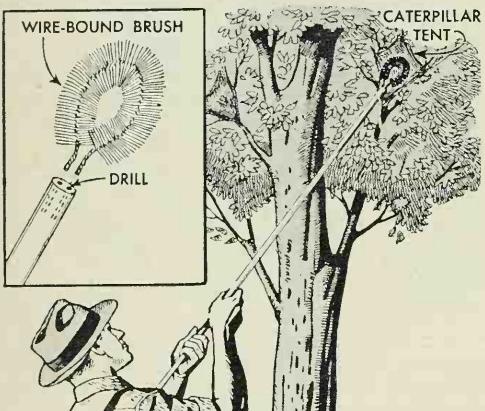
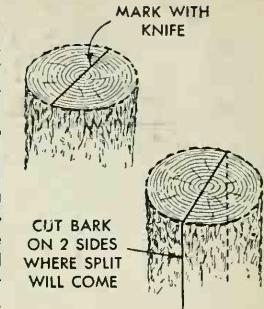
All grafting involves the use of cions. These are budding twigs or roots which are clipped from live trees or plants and brought into contact, called the *union*, with the inner bark or the roots of another plant, called the *stock*. The union may be made with a tree or plant of the same kind, or a different variety of the same species or genus. Thus, grafting may be used to grow new branches on the side of a tree that has shaped poorly, or on which some of the branches have been damaged. Or, the roots of a hardier variety of shrub may be grafted to those of one which is graceful but rather delicate. The chief methods are *bud grafting*, *cleft grafting*, *whip grafting* and *inarching*.

Bud grafting is illustrated above. The first need is a good budding knife, which may be purchased, although any sharp knife with a thin blade that ends in a curve will do. Then select the cion—a healthy twig that has grown 12 in. or more during the past season—and cut one of the buds from it. The bud is cut away to include a bit of the bark above and below, and a thin shaving of the wood beneath the bud. Make a T-shaped cut in the stock, or tree onto which the bud is to be grafted. Make the first cut lengthwise of the stem; next a crescent-shaped cross cut at the top of the first cut. Peel the edges of the bark away carefully, just enough to allow the bud to be slipped inside the bark. The cut surface under the bud should fit snugly against the wood of the stock; if not, trim it to fit. Then tie the slit bark above and below the bud with light cotton twine. A wrapping of muslin that has been dipped in melted paraffin or beeswax should then be placed around the bud. The bandage is removed in from 10 days to two weeks. At intervals during the first weeks of active growth, the sprouts that form around the bud should be removed so that they will not restrict growth. In the spring following the grafting, the stock should be cut away just above the union. Slant this cut away from the bud, and the trunk or branch will grow so as to hide the graft within a few years.

WHIP GRAFTING**INARCHING**



Even when a grafted tree is transplanted properly with the graft above the ground, the top part of the tree will sometimes send out roots. This can be prevented by tying tar paper around the graft. As the tree grows, the wrapping can be allowed to rot away



Instead of endangering fruit or shade trees by burning caterpillar tents with a torch, just pull them off with a long-handled brush and drop them into a can of kerosene. Detail shows how brush can be made



A strong solution of salt peter will do away with an old stump in the lawn. Bore a series of holes in the top and sides of the stump and fill them with the solution. The wood will soon rot and break up

Cleft grafting often fails because the bark is torn at the point where the tree stock is split to receive the cion. To avoid this, cut cleanly through the bark on both sides with a sharp knife before making the split in the tree center. A split can then be made and the bark will part cleanly without tearing in big patches

Cleft grafting is usually done when the stock is much larger than the cion. The stock is cut off square at the place where the union is desired. A wedge-shaped cleft is then made in the stub. A grafting tool is available for this, but the cleft can be made satisfactorily with a broad chisel. The cion should be a healthy twig including at least three buds. Cut it so that the lowest bud will be just outside the wedge. Trim the end of the cion to a chisel edge, hold the stock wedge open and insert the cion up to the lower bud. Then let the wedge close and clamp upon the cion. If the stock is large enough, place two cions on either end of the stock to increase the chances of growth. If both cions grow, remove one after the first year. This union need not be bandaged, but must be covered with grafting wax. You can make your own by melting together resin, 2 parts, linseed oil, 2 parts, and beeswax, 1 part. When cool, the mixture should be pulled and worked until it is pliable and light yellow.

Whip grafting is the method used for joining roots. This grafting is done in winter, when the roots are dormant. The joined parts are stored until spring planting. The cion is cut diagonally. Then the cut surface is split to form a thin tongue. The stock is prepared in the same way, and the roots are joined and tied with light twine which has been soaked in grafting wax. The grafts are stored in boxes with moistened sawdust, moss or sand.

Inarching, the simplest graft, is used when the plants grow quite close together. The barks are cut and the plants are bound together at this point. Inarching occurs in nature.

Grafted cions often are damaged or displaced when birds alight on them. This can be avoided by fastening a thin strip of wood to the branch on which the graft is made. The birds will perch on the strip, extending over the cion about 3 in.





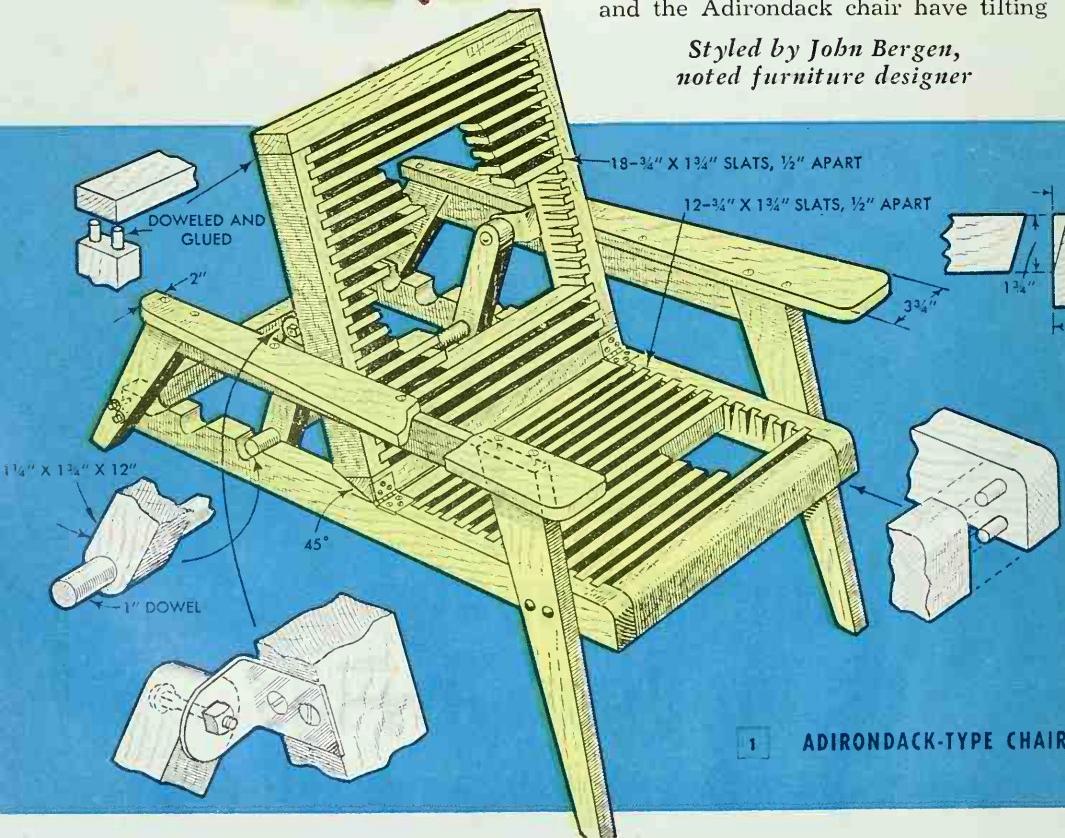
Things to make
for outdoor living...

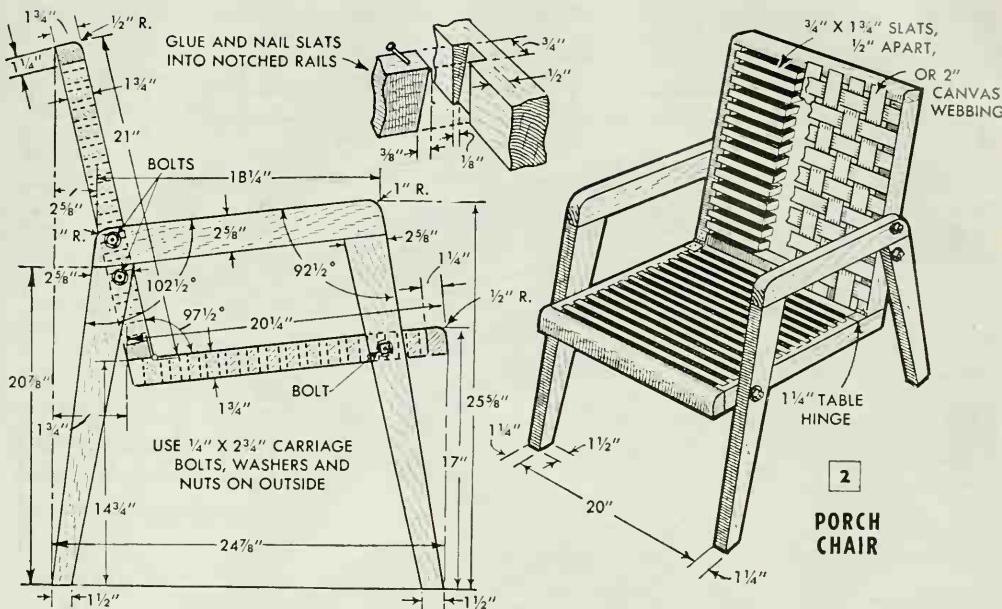


LAWN FURNITURE YOU CAN MAKE

HERE IS THE "new look" in outdoor furniture, designed by a well-known furniture stylist who has come up with some original and exciting pieces which feature knock-down construction to lick the problem of winter storage. By building these easy-to-make pieces of furniture yourself, the budget for your home grounds need not be unreasonably stretched to include outdoor furnishings. Gay, comfortable and easy to dismantle, this striking lawn furniture incorporates the use of ready-made waterproof cushions. These can be purchased from department stores in sizes to fit the various pieces of the group. Shown in full color on this and the preceding page, the complete ensemble features six pieces, including an Adirondack-type chair, porch chair, serving cart, garden lounge, porch glider and a table-and-bench set. Several of the pieces, such as the porch chair, lounge and glider, also can be used during the winter on an enclosed porch or in a sunroom. Both the lounge and the Adirondack chair have tilting

*Styled by John Bergen,
noted furniture designer*

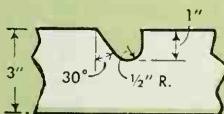




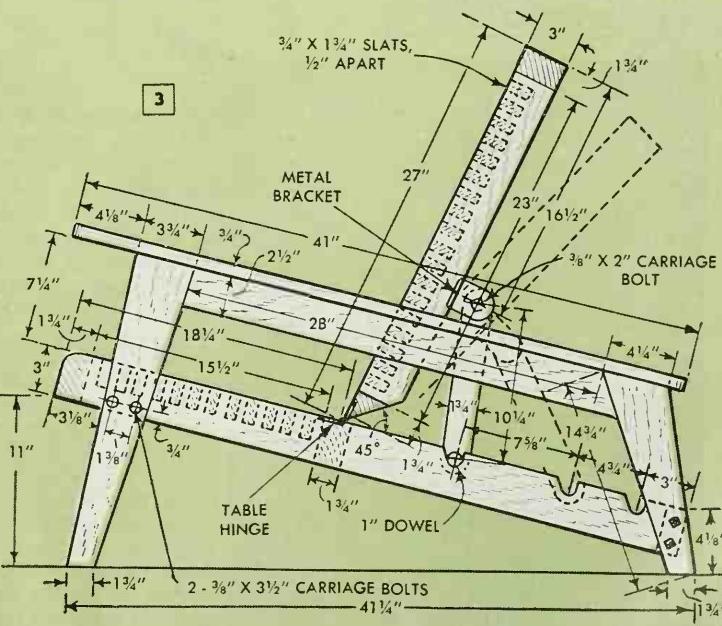
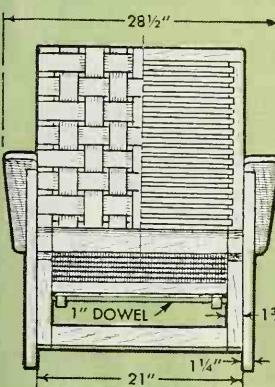
backs that can be adjusted to suit the comfort of the individual. Except in the case of the garden table-and-bench set, a choice of slats or webbing is given in constructing the seats and backs of the furniture. Both types are partially indicated in most of the drawings, and this should not be confused with actual construction details.

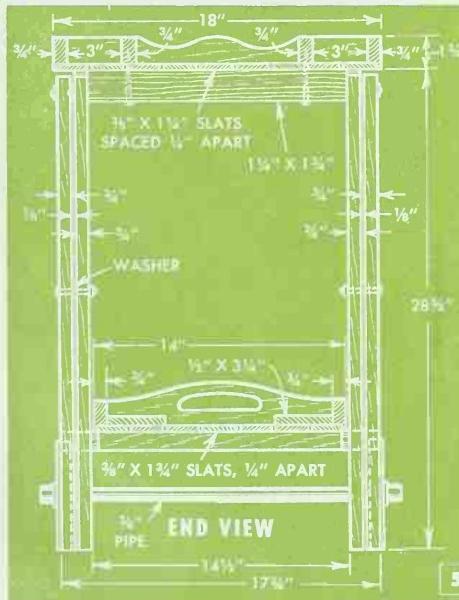
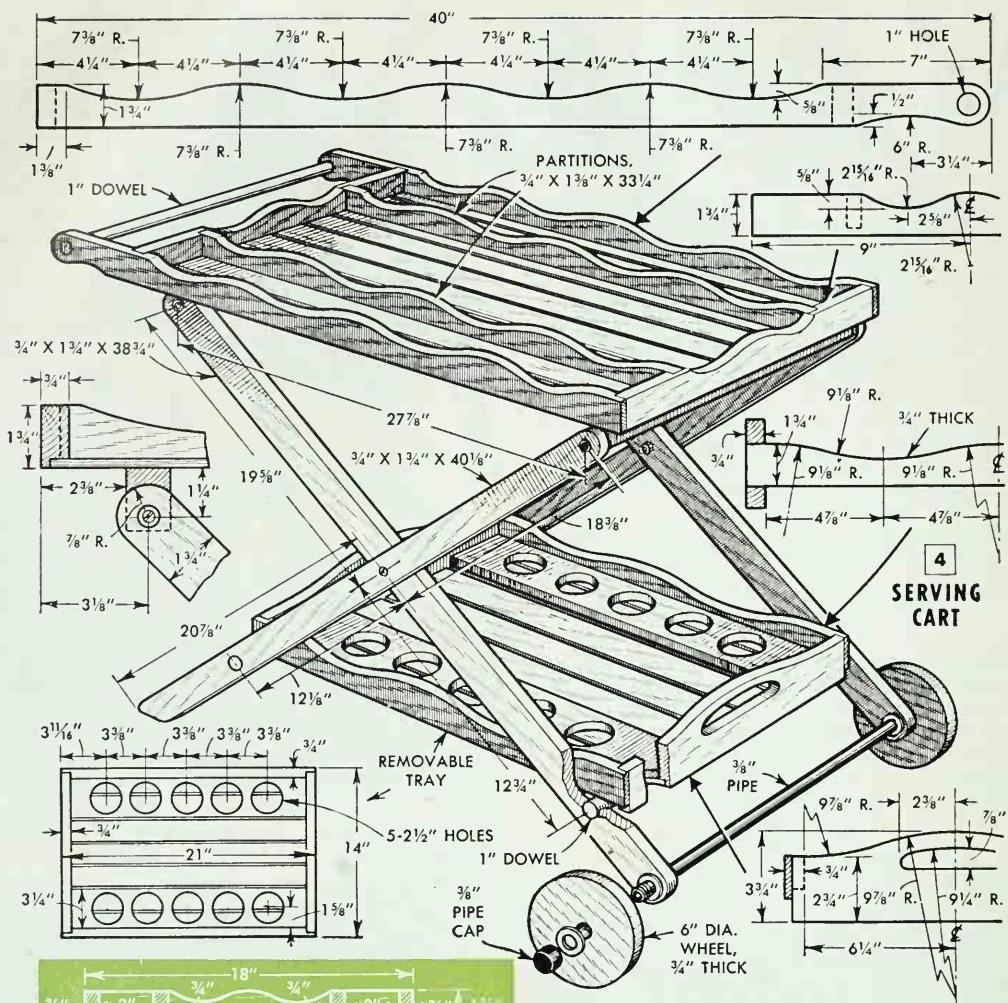
While redwood and cypress are two of the

most durable woods, especially suitable for outdoor furniture, common lumberyard stock, such as yellow pine or fir, is perfectly satisfactory if the pieces are kept well painted. The material list on page 153 itemizes the amount of lumber needed for each piece, and, for those who prefer to work from plans larger than magazine size, large black-and-white prints are available.



DETAIL OF NOTCH





The Adirondack chair, detailed in Figs. 1 and 3, has a tilting back which can be adjusted to three reclining positions. The framework for both the seat and the back of the chair is made from 2 x 4 material, while the legs and the rails which support the arms can be of 1 $\frac{1}{8}$ or 1 $\frac{1}{4}$ -in. stock. Each framework is made as a separate unit and the back is hinged to the seat with 1 $\frac{1}{4}$ -in. table hinges, set flush. If slats are used instead of webbing, the slanting notches for them must be made before the frames are doweled and glued together. These can be cut with a 3/4-in. dado head on a circular saw by utilizing a narrow strip tacked temporarily to the face of the work along the rear edge. The strip is positioned to tilt the work at an angle that will produce a notch 1 $\frac{3}{4}$ in. long. The slats are cut from common 1 x 2 lumber, the ends being sawed off at an angle to fit the slanting notches and then nailed in place, flush with the surface. The support for the tilting back

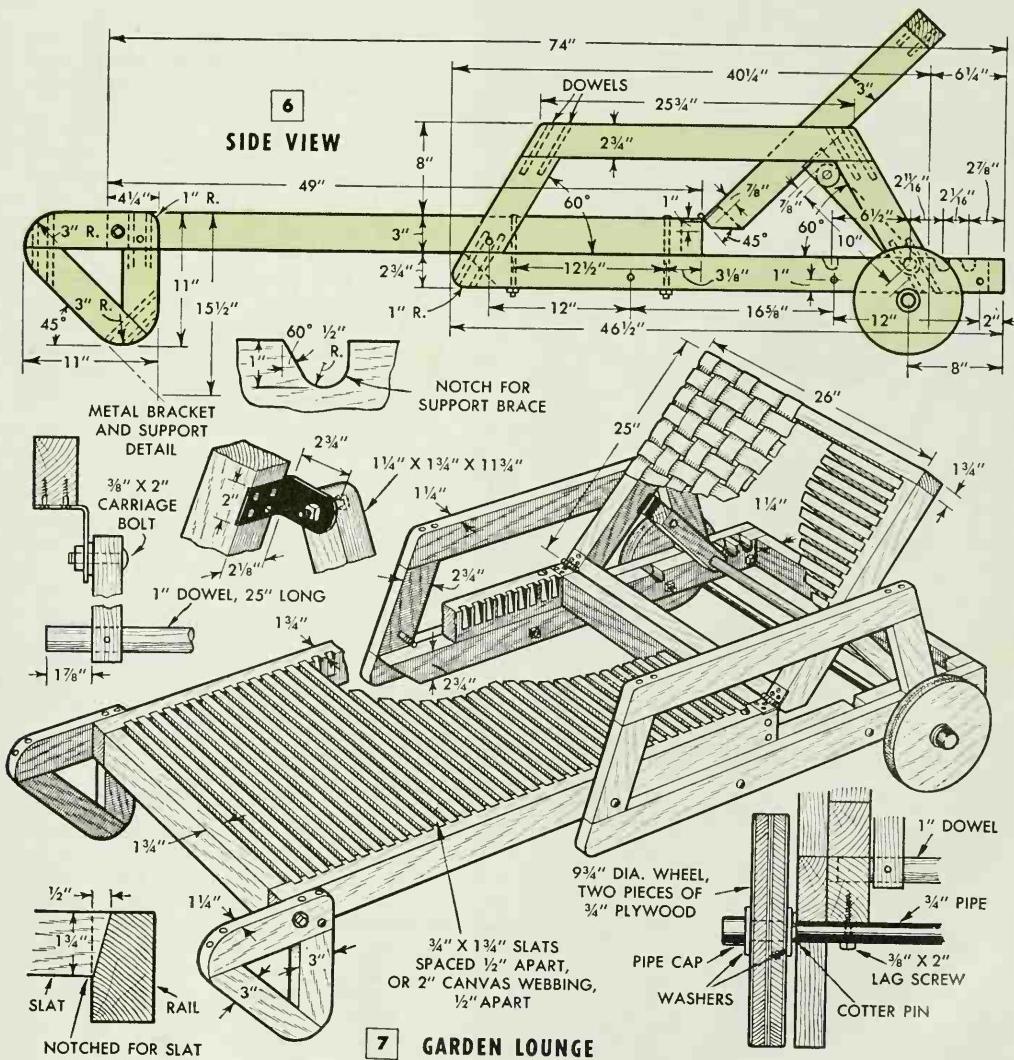
is pivoted to it with sheet-metal brackets in the manner shown in Fig. 1. If webbing is preferred to the slats, use either nylon parachute webbing or common canvas webbing and interlace it as shown. The ready-made cushions will hide the tacks used in fastening webbing to the frames.

The porch chair, Fig. 2, is somewhat similar in construction. The seat and back are hinged together to fold flat for storing, while the legs and arms can be taken off as single units by removing only six nuts and washers. Frames for the seat and back are assembled from $1\frac{1}{4}$ x $1\frac{3}{4}$ -in. stock, notched if slats are used, before doweling and gluing together.

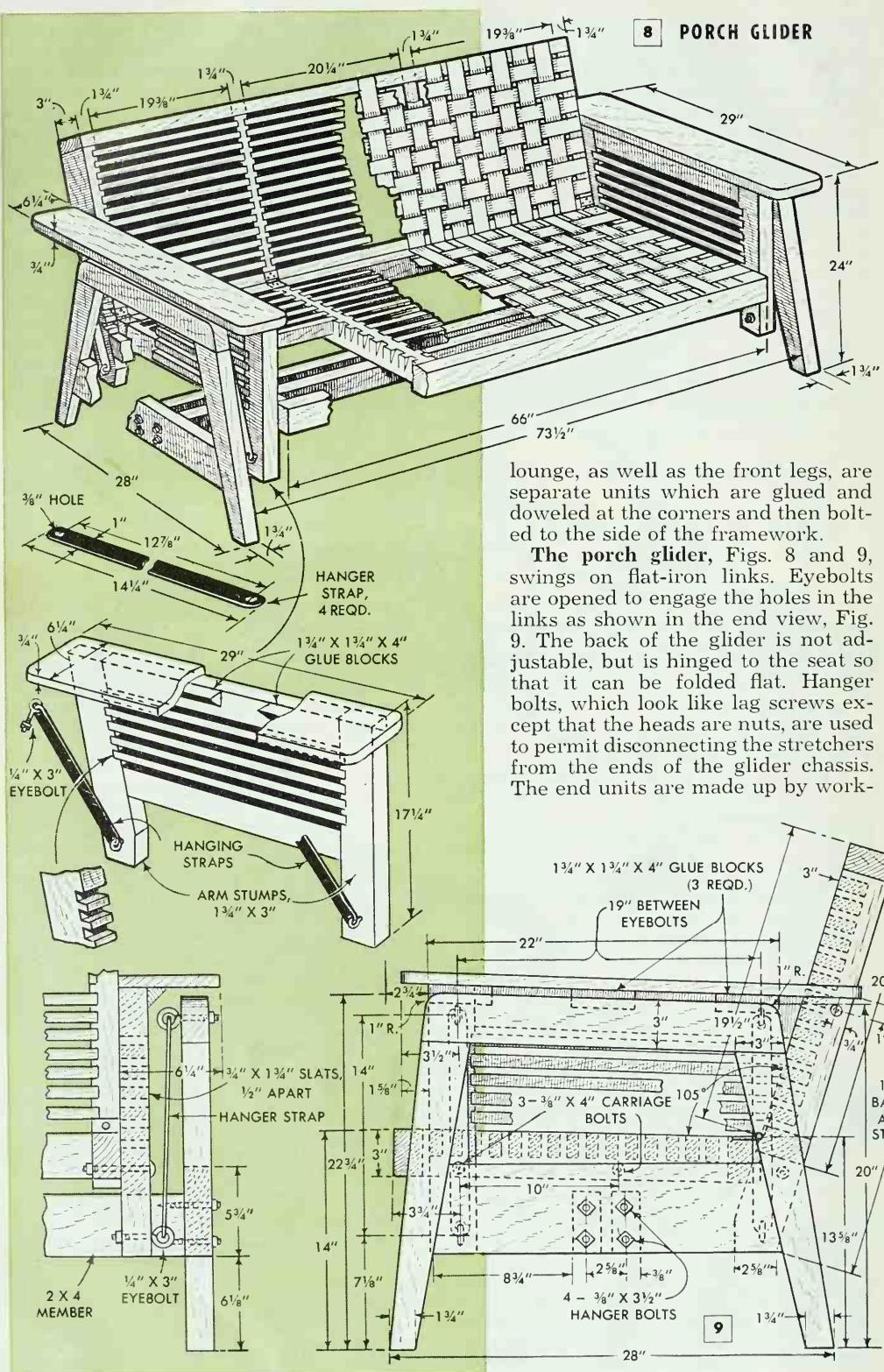
The serving cart, Figs. 4 and 5, can be wheeled about and features a removable beverage tray which rides on two rungs

fitted between the crossed legs. Each pair of legs are duplicates, and registering holes for the pipe axle, dowel rungs and screw fastenings are bored at one time through each set. The upper ends of the legs are pivoted with wood screws to $1\frac{1}{4} \times 1\frac{3}{4}$ -in. cleats which support the upper tray.

The garden lounge, Figs. 6 and 7, like the Adirondack chair, has a tilting back which is supported in the same manner except that it is adjustable to four positions. The bed frame of the lounge, including the tilting back, is made of 2×4 material, with a second frame of lighter stock being bolted to the underside. This second frame carries the wheel axle and also the notches which engage the tilting back support. The end-view detail shows how the pipe axle is bolted in place with lag screws. The arms of the



8 PORCH GLIDER



lounge, as well as the front legs, are separate units which are glued and doweled at the corners and then bolted to the side of the framework.

The porch glider, Figs. 8 and 9, swings on flat-iron links. Eyebolts are opened to engage the holes in the links as shown in the end view, Fig. 9. The back of the glider is not adjustable, but is hinged to the seat so that it can be folded flat. Hanger bolts, which look like lag screws except that the heads are nuts, are used to permit disconnecting the stretchers from the ends of the glider chassis. The end units are made up by work-

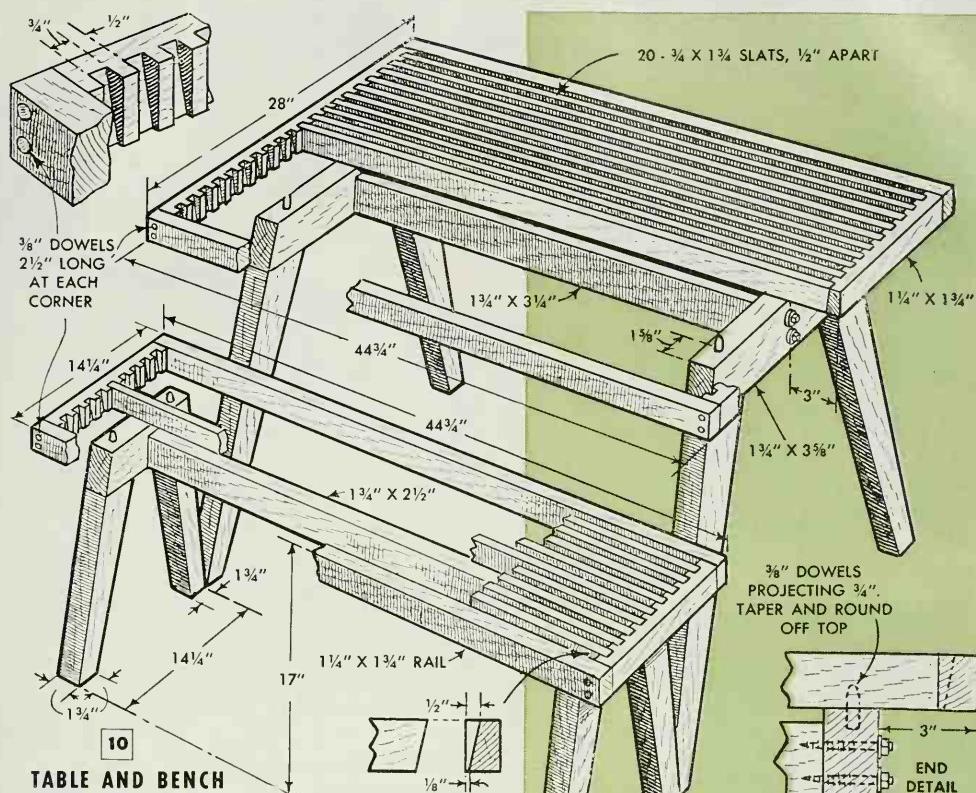
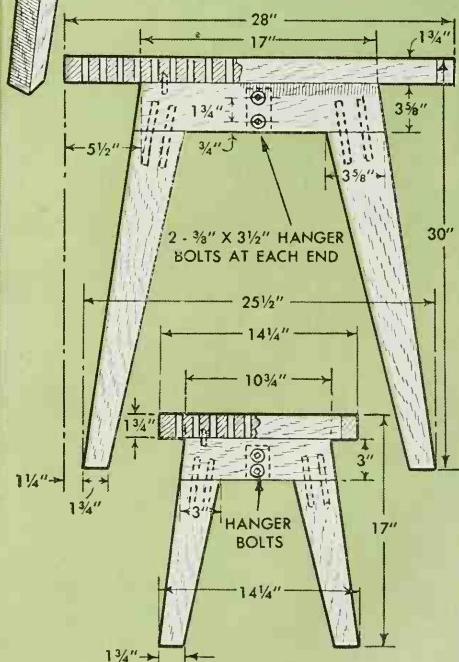


TABLE AND BENCH

ing from a full-size paper pattern laid out according to Fig. 9, and placing the pieces right over the pattern to obtain the correct slant for the legs and top arm rails.

The picnic table-and-bench set, Fig. 10, also can be taken completely apart for storing. The tops of both the table and benches lift off, being held in place merely by stub pins which engage registering holes. Hanger bolts in the ends of the center stretchers permit the U-shaped legs to be removed in a jiffy. Except for size, the construction of the three pieces is exactly alike. As the slats are spaced $\frac{1}{2}$ in. apart, it is best to paint them before they are nailed in place. Note that here the tapering notches are cut the full width of the end rails. This can be done with a small dado head by gluing a strip of beveled siding temporarily to the inside face of the work to bring the line of cut parallel with the saw table. The siding strip is glued with paper between it and the work so that it can be pried off easily when all the notches have been cut. However, to simplify the job, the notches can be cut straight through and the 1 x 2 slats glued in place and nailed from the outside face. The legs are cut from 2 x 4 material and glued and doweled to the apron pieces. Screws can be used instead of dowels at the corners of the bench tops.



END VIEWS OF TABLE AND BENCH



LUMBER LIST FOR LAWN FURNITURE

ADIRONDACK CHAIR

2 pcs. $1\frac{1}{4}$ x 3 x 42 in.—Side seat rails
 1 pc. $1\frac{1}{4}$ x 3 x 21 in.—Front seat rail
 1 pc. $1\frac{1}{4}$ x 3 x $17\frac{1}{2}$ in.—Center seat rail
 1 pc. $1\frac{1}{4}$ x 3 x $17\frac{1}{2}$ in.—Back seat rail
 2 pcs. $1\frac{1}{4}$ x 3 x 27 in.—Side back rails
 1 pc. $1\frac{1}{4}$ x 3 x 21 in.—Top back rail
 1 pc. $1\frac{1}{4}$ x $2\frac{1}{4}$ x $17\frac{1}{2}$ in.—Bottom back rail
 30 pcs. $\frac{3}{4}$ x $1\frac{1}{4}$ x $18\frac{1}{2}$ in.—Seat and back slats
 2 pcs. $1\frac{1}{4}$ x $3\frac{3}{4}$ x 22 in.—Front legs
 2 pcs. $1\frac{1}{4}$ x $3\frac{3}{4}$ x $14\frac{1}{2}$ in.—Back legs
 2 pcs. $1\frac{1}{4}$ x $2\frac{1}{2}$ x $29\frac{1}{2}$ in.—Arm aprons
 2 pcs. $\frac{3}{4}$ x $3\frac{3}{4}$ x 41 in.—Tops of arms
 2 pcs. $1\frac{1}{4}$ x $1\frac{1}{4}$ x 12 in.—Back stays
 1 pc. 1-in. dia. x 20 in. long—Dowel rung
 33 yds. 2-in. canvas webbing—Seat and back covering

PORCH CHAIR

2 pcs. $1\frac{1}{4}$ x $1\frac{1}{4}$ x $20\frac{1}{4}$ in.—Side seat rails
 1 pc. $1\frac{1}{4}$ x $1\frac{1}{4}$ x 20 in.—Front seat rail
 1 pc. $1\frac{1}{4}$ x $1\frac{1}{4}$ x $17\frac{1}{2}$ in.—Back seat rail
 2 pcs. $1\frac{1}{4}$ x $1\frac{1}{4}$ x 21 in.—Side back rails
 1 pc. $1\frac{1}{4}$ x $1\frac{1}{4}$ x 20 in.—Top back rail
 1 pc. $1\frac{1}{4}$ x $1\frac{1}{4}$ x $17\frac{1}{2}$ in.—Bottom back rail
 27 pcs. $\frac{3}{4}$ x $1\frac{1}{4}$ x $18\frac{1}{2}$ in.—Seat and back slats
 2 pcs. $1\frac{1}{4}$ x $2\frac{1}{2}$ x $23\frac{1}{2}$ in.—Front legs
 2 pcs. $1\frac{1}{4}$ x $2\frac{1}{2}$ x $21\frac{1}{4}$ in.—Back legs
 2 pcs. $1\frac{1}{4}$ x $2\frac{1}{2}$ x 19 in.—Arms
 20 yds. 2-in. canvas webbing—Seat and back covering

SERVING CART

2 pcs. $\frac{3}{4}$ x $1\frac{1}{4}$ x 40 in.—Top side rails
 2 pcs. $\frac{3}{4}$ x $1\frac{1}{4}$ x 17 in.—Top end rails
 2 pcs. $\frac{3}{4}$ x $1\frac{1}{8}$ x $33\frac{1}{4}$ in.—Partitions
 7 pcs. $\frac{3}{8}$ x $1\frac{1}{4}$ x $33\frac{1}{4}$ in.—Bottom slats
 2 pcs. $\frac{3}{8}$ x $1\frac{1}{8}$ x $33\frac{1}{4}$ in.—Bottom slats
 1 pc. $1\frac{1}{4}$ x $1\frac{1}{4}$ x $14\frac{1}{2}$ in.—Brace
 1 pc. $1\frac{1}{4}$ x $1\frac{1}{4}$ x $16\frac{1}{2}$ in.—Brace
 2 pcs. $\frac{3}{4}$ x $1\frac{1}{4}$ x $38\frac{1}{4}$ in.—Legs
 2 pcs. $\frac{3}{4}$ x $1\frac{1}{4}$ x $40\frac{1}{8}$ in.—Legs
 4 pcs. $\frac{3}{4}$ x 6 x 6 in.—Wheels
 2 pcs. $\frac{3}{4}$ x $1\frac{1}{4}$ x 21 in.—Tray sides
 2 pcs. $\frac{3}{4}$ x $3\frac{3}{4}$ x $13\frac{1}{2}$ in.—Tray ends
 7 pcs. $\frac{3}{8}$ x $1\frac{1}{4}$ x 20 in.—Tray bottom
 2 pcs. $\frac{1}{2}$ x $3\frac{1}{4}$ x $19\frac{1}{2}$ in.—Glass holders
 1 pc. 1-in. dia. x $17\frac{1}{2}$ in.—Dowel
 1 pc. 1-in. dia. x 17 in.—Dowel
 1 pc. 1-in. dia. x $17\frac{3}{4}$ in.—Dowel

GARDEN LOUNGE

2 pcs. $1\frac{1}{4}$ x 3 x 49 in.—Seat side rails (front half)
 2 pcs. $1\frac{1}{4}$ x 3 x $22\frac{1}{2}$ in.—Seat end rails (front half)
 1 pc. $1\frac{1}{4}$ x 3 x $22\frac{1}{2}$ in.—Seat end rail (back half)
 2 pcs. $1\frac{1}{4}$ x 3 x $23\frac{1}{4}$ in.—Seat side rails (back half)

1 pc. $1\frac{1}{4}$ x 3 x 26 in.—Top rail for back
 1 pc. $1\frac{1}{4}$ x $2\frac{1}{2}$ x $22\frac{1}{2}$ in.—Bottom rail for back
 2 pcs. $1\frac{1}{4}$ x $2\frac{1}{4}$ x $44\frac{1}{4}$ in.—Back side rails
 2 pcs. $1\frac{1}{4}$ x $2\frac{1}{4}$ x 29 in.—Tops of arms
 2 pcs. $1\frac{1}{4}$ x $2\frac{1}{4}$ x $46\frac{1}{4}$ in.—Bottoms of arms
 2 pcs. $1\frac{1}{4}$ x $2\frac{1}{4}$ x $14\frac{1}{4}$ in.—Front arm stumps
 2 pcs. $1\frac{1}{4}$ x $2\frac{1}{4}$ x $11\frac{1}{8}$ in.—Back arm stumps
 2 pcs. $1\frac{1}{4}$ x $1\frac{1}{4}$ x $11\frac{1}{4}$ in.—Back supports
 2 pcs. $1\frac{1}{4}$ x 3 x $15\frac{1}{2}$ in.—Front leg horizontals
 2 pcs. $1\frac{1}{4}$ x 3 x 8 in.—Front leg uprights
 2 pcs. $1\frac{1}{4}$ x 3 x $17\frac{1}{2}$ in.—Front leg diagonals
 53 pcs. $\frac{3}{4}$ x $1\frac{1}{4}$ x $23\frac{1}{2}$ in.—Seat and back slats
 4 pcs. $\frac{3}{4}$ x $9\frac{1}{4}$ x $9\frac{1}{4}$ in.—Wheels
 1 pc. 1-in. dia. x 25 in. long—Dowel rung
 60 yds. 2-in. canvas webbing—Seat and back covering

PORCH GLIDER

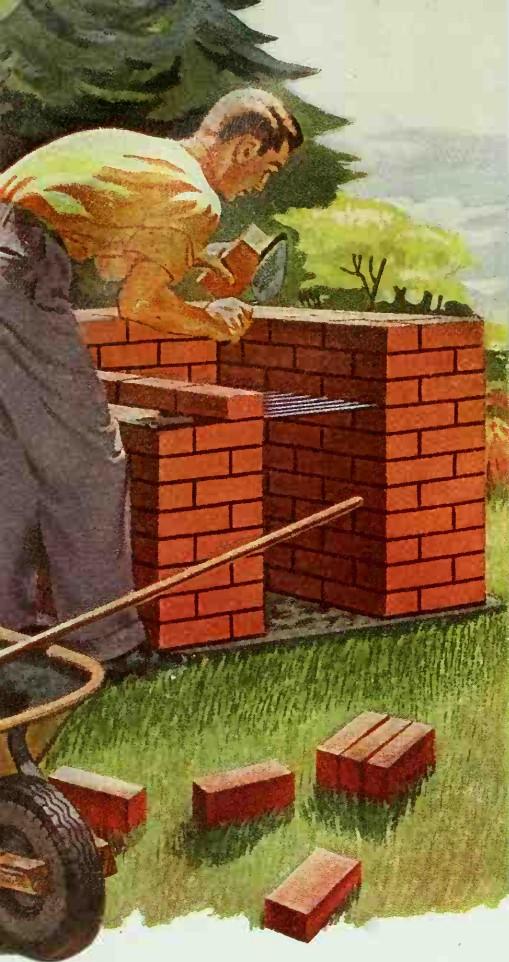
4 pcs. $1\frac{1}{4}$ x 3 x $20\frac{1}{8}$ in.—Legs
 2 pcs. $1\frac{1}{4}$ x 3 x $22\frac{1}{4}$ in.—Top leg rails
 2 pcs. $1\frac{1}{4}$ x $5\frac{1}{4}$ x 22 in.—Lower leg rails
 2 pcs. 2 x 4 x $73\frac{1}{2}$ in.—Leg stretchers
 2 pcs. $\frac{3}{4}$ x $6\frac{1}{4}$ x 29 in.—Arms
 2 pcs. $1\frac{1}{4}$ x $2\frac{1}{2}$ x $20\frac{1}{4}$ in.—Top arm rails
 2 pcs. $1\frac{1}{4}$ x 3 x 18 in.—Lower arm rails
 2 pcs. $1\frac{1}{4}$ x 3 x $17\frac{1}{4}$ in.—Front arm stumps
 2 pcs. $1\frac{1}{4}$ x 3 x $17\frac{3}{4}$ in.—Rear arm stumps
 1 pc. $\frac{3}{4}$ x $1\frac{1}{4}$ x 108 in.—Arm slats
 1 pc. $1\frac{1}{4}$ x $1\frac{1}{4}$ x 4 in.—Arm glue blocks
 1 pc. $1\frac{1}{4}$ x 3 x 66 in.—Front seat rail
 1 pc. $1\frac{1}{4}$ x 3 x $62\frac{1}{2}$ in.—Rear seat rail
 2 pcs. $1\frac{1}{4}$ x 3 x 23 in.—Side seat rails
 2 pcs. $1\frac{1}{4}$ x 3 x $19\frac{1}{2}$ in.—Center seat rails
 1 pc. $1\frac{1}{4}$ x 3 x 66 in.—Top rail for back
 1 pc. $1\frac{1}{4}$ x 3 x $62\frac{1}{2}$ in.—Lower rail for back
 2 pcs. $1\frac{1}{4}$ x 3 x $22\frac{1}{2}$ in.—Side rails for back
 2 pcs. $1\frac{1}{4}$ x 3 x $16\frac{1}{4}$ in.—Center rails for back
 56 pcs. $\frac{3}{4}$ x $1\frac{1}{4}$ x $20\frac{1}{8}$ in.—Side back and seat slats
 28 pcs. $\frac{3}{4}$ x $1\frac{1}{4}$ x $21\frac{1}{4}$ in.—Center back and seat slats
 105 yds. 2-in. canvas webbing—Seat and back covering

TABLE-AND-BENCH SET (table)

2 pcs. $1\frac{1}{4}$ x $1\frac{1}{4}$ x $44\frac{1}{4}$ in.—Top side rails
 2 pcs. $1\frac{1}{4}$ x $1\frac{1}{4}$ x $25\frac{1}{2}$ in.—Top end rails
 20 pcs. $\frac{3}{4}$ x $1\frac{1}{4}$ x $43\frac{1}{4}$ in.—Slats
 4 pcs. $1\frac{1}{4}$ x $3\frac{1}{8}$ x $25\frac{1}{8}$ in.—Legs
 2 pcs. $1\frac{1}{4}$ x $3\frac{3}{8}$ x $18\frac{1}{16}$ in.—Leg rails
 1 pc. $1\frac{1}{4}$ x $3\frac{1}{4}$ x $35\frac{1}{4}$ in.—Brace

(Material per bench)

2 pcs. $1\frac{1}{4}$ x $1\frac{1}{4}$ x $44\frac{1}{4}$ in.—Top side rails
 2 pcs. $1\frac{1}{4}$ x $1\frac{1}{4}$ x $11\frac{1}{4}$ in.—Top end rails
 9 pcs. $\frac{3}{4}$ x $1\frac{1}{4}$ x $43\frac{1}{4}$ in.—Slats
 4 pcs. $1\frac{1}{4}$ x 3 x $11\frac{1}{4}$ in.—Legs
 2 pcs. $1\frac{1}{4}$ x 3 x $11\frac{1}{2}$ in.—Leg rails
 1 pc. $1\frac{1}{4}$ x $2\frac{1}{2}$ x $35\frac{1}{4}$ in.—Brace



Planning and Building Outdoor Fireplaces



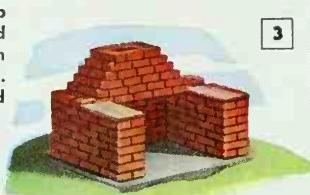
Pointers on location and arrangement—importance of good design—how to mix and use mortar — how to lay brick, etc.

HAVE YOU been anticipating the pleasures of an outdoor fireplace but have not done anything about it, either because the cost of having the work done is prohibitive, or because it seems that the job is too forbidding to tackle yourself? Building one isn't so difficult if you arm yourself with guiding facts on just how to proceed—information such as is contained in this article.

What type of fireplace do you want? You may prefer a fireplace of the simplest type like the one shown in Fig. 2, which is low and consists of bricks laid without mortar. This type is serviceable if used only occasionally. In the more permanent structure shown in Fig. 3, a concrete foundation slab supports three sides and



Simplest fireplace setup consists of brick laid without mortar to form three sides for the grate. The chimney is omitted



For permanence, fireplace is built on concrete slab with brick laid in mortar. Chimney is low for better draft

a chimney. Grates can be formed by setting iron bars in the masonry, but greater cooking efficiency is possible by using a steel firebox and ashpit around which the fireplace is built as in Fig. 4. Then, there are more elaborate fireplaces. One combining a cooking grill and Dutch oven with an open hearth that gives warmth on cool evenings is shown in Fig. 5. Storage space for cooking utensils and fuel can be included. You also can incorporate a trash burner or a garbage incinerator, concealed from the cooking end of the fireplace and operating independently.

Important facts about location: After deciding just which type of fireplace you want, determine its location. Select a dry spot having good drainage, where water does not collect and where heaving frost will do the least amount of damage to units that do not have deep foundation walls. Prevailing wind direction can make your fireplace either a pleasure or a tribulation. The fireplace should face prevailing winds, Fig. 1, so that full advantage is taken of the draft and so the smoke will blow away from the crowd. Also, in order



Photo courtesy Mangel Florist, Chicago

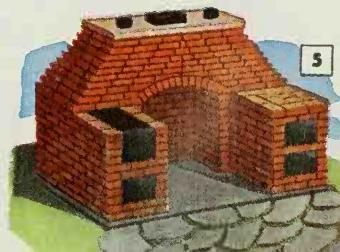
to avoid interference with the draft, a fireplace should not be located under a tree, Fig. 6, or under a high wall. Other important considerations when selecting the location are appearance and utility. The fireplace should enhance your yard or garden, and it must not be too large in proportion to the lot. It should neither block the view from house windows nor be close to a doorway. Equally important, it should not be situated where the wind tends to carry the smoke into the house. The appearance also can be improved by using a type and color of brick or stone for the fireplace which harmonize with the house.

A firm foundation: The fireplace must have adequate support to prevent it from settling unevenly in soft earth, or from being damaged by frost. Where frost is negligible, a concrete slab 6 or 8 in. thick and reinforced with iron rods and pipes, Fig. 7, will be adequate. The top of the slab should extend a couple of inches above the ground level so that water will not collect in the ashpit. For the same reason, the floor of an ashpit should always slope to drain out water. If the soil does not have good drainage, the slab should be poured over an 8-in. layer of crushed stone or cinders, which has been well tamped.

By using a steel firebox and ashpit, greater cooking efficiency is possible because of advantage of the better draft control

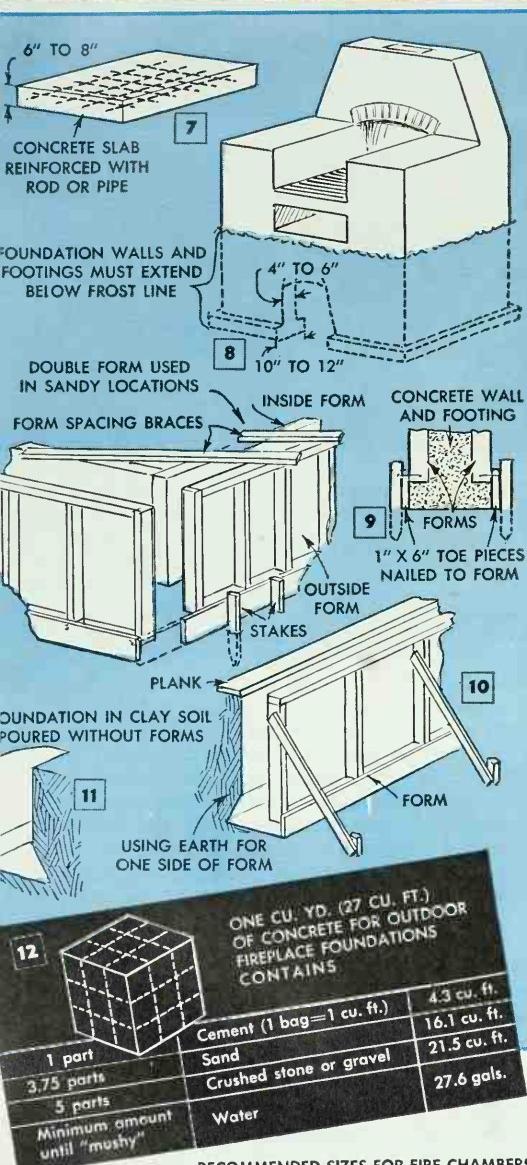


Warmth and cheer of an open fireplace on cool evenings is an added advantage of a more elaborate one

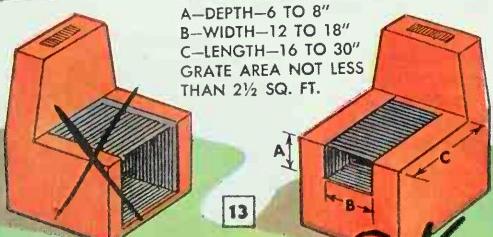


In northern climate, a small, lightweight structure may be built on a slab foundation as described above, but a heavy structure requires a concrete foundation wall extending below the frost line and having a footing as in Fig. 8. For concrete foundations in sandy or loose earth, a double form should be used as in Fig. 9. To avoid buying lumber for making forms, you may be able to rent or borrow ready-made forms from a cement contractor. On large jobs, it is often advisable to have the concrete work done by a contractor. It is possible to pour the footing and wall at one time by nailing 1-in. wooden strips to the lower edges of the forms and bracing them with stakes, Fig. 9. In heavy soil, such as clay, the soil itself often will serve as one side of the form, Fig. 10, or it may be possible to dispense with wooden forms entirely, Fig. 11. It is best to pour all the concrete for the foundation at one time. After the forms are removed, the floor of the fireplace can be poured. Concrete foundation walls consist of ingredients in the proportions given in the table, Fig. 12. To determine quickly the quantity of ingredients required for your fireplace, figure its volume in cubic feet. If, for example, the volume is 54 cu. ft., or twice as much as 27 cu. ft.

6 CLEARANCE ABOVE



RECOMMENDED SIZES FOR FIRE CHAMBERS
 A—DEPTH—6 TO 8"
 B—WIDTH—12 TO 18"
 C—LENGTH—16 TO 30"
 GRATE AREA NOT LESS THAN 2½ SQ. FT.

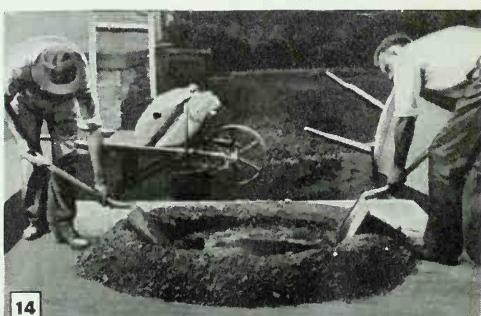


on which the quantities in Fig. 12 are based, you will need just twice as much of each ingredient. Or, if you require only 9 cu. ft., you will need only one third of the quantities given in the table. Only enough water is added to form a mushy, but not a soupy, mixture. The ingredients are first mixed thoroughly while dry, on a level platform or in a shallow box. When mixed, the pile is shoveled outward to build up the edge and form a depression into which water is poured, Fig. 14. Then the material is pushed from the edges into the water slowly.

Facts about good design: Outdoor fireplaces frequently are made too large and massive, even though small ones are less expensive and easier to build. For the sake of convenience, the area of a grate should not be less than 2½ sq. ft. Cast-iron grates are available in many sizes from manufacturers of fireplace equipment. These or homemade grates shown in Fig. 17, can be held in place with pins or bars set in the mortar. Dimensions of grates to be purchased should be known prior to building so that the fire-chamber dimensions can be determined. A built-in grate, consisting of iron rods or lengths of pipe, can be installed in the masonry as in Fig. 18. The rods should extend 2 or 3 in. into the wall, and they should be spaced not to exceed 1¼ in. A little extra care taken to make the grate surface perfectly level will be appreciated when the fireplace is being used. Do not permit the ends of the rods to butt tightly against any part of the masonry but provide a little space to compensate for expansion of the metal when hot. In some cases where this precaution was neglected, fireplaces have been wrecked by expanding metal.

Best results are obtained in building a fire if the fuel rests on a grate through which air passes to the fire. This type of bottom grate is located over an ashpit and is heavier than the top grate on which cooking is done. For greatest efficiency, the distance between the two grates should not exceed 8 in. Other recommended dimensions for efficient fire chambers are given in Fig. 13. There also is a definite

Photo courtesy Portland Cement Assn.



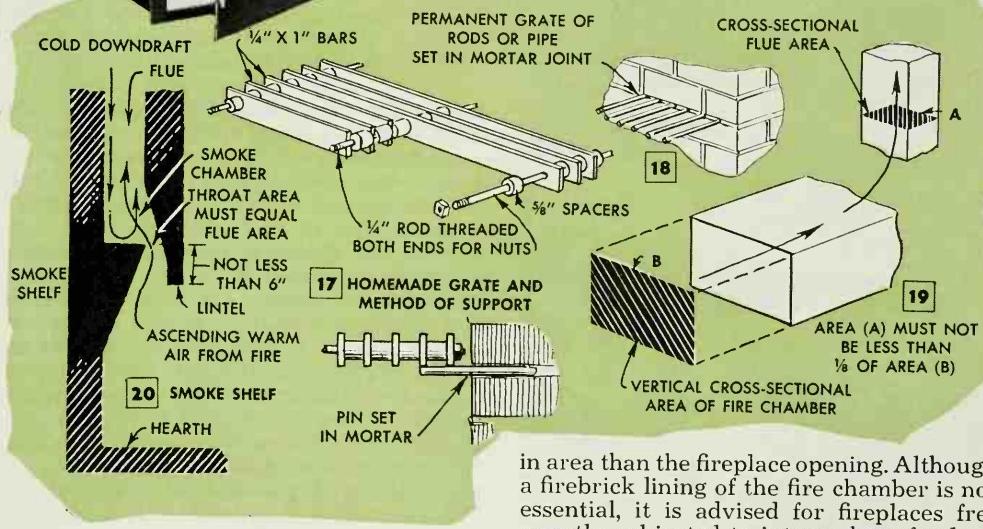
14

Photos courtesy
Donley Brothers Co.
Cleveland, Ohio

15



16

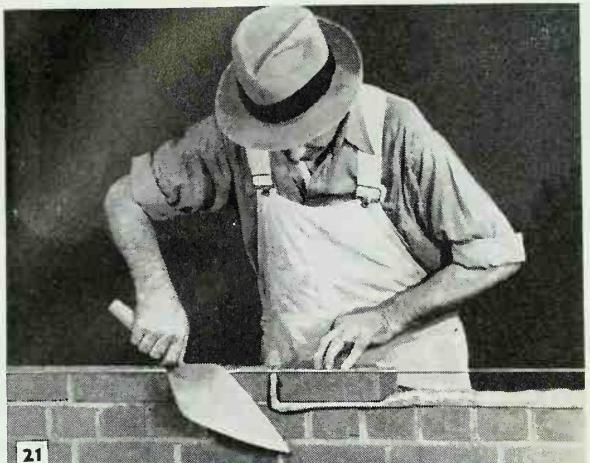


relationship in size between the fire chamber and the chimney flue. The cross-sectional area of the chimney flue should not be less than one eighth of the vertical cross-sectional area of the fire chamber, Fig. 19. Many builders of outdoor fireplaces use ready-made fire chambers as shown in Figs. 15 and 16.

A smoke shelf is an important feature to prevent descending cold air in the chimney from interfering with the upward movement of smoke. The shelf turns the descending cold air into the ascending column of hot, smoke-filled air with which it mixes and returns up the chimney, as in Fig. 20. The width of the smoke shelf is about equal to that of the chimney flue. The smoke chamber flares out at an angle of approximately 30 deg. past the front of the smoke shelf which is supported by brickwork built out at an angle from the rear wall of the fireplace. The space from lintel to smoke shelf must not be less than 6 in., and the opening, or "throat," located just in front of the smoke shelf should not be less

in area than the fireplace opening. Although a firebrick lining of the fire chamber is not essential, it is advised for fireplaces frequently subjected to intense heat for long periods, especially when the brick or stone used is porous like sandstone, which absorbs water readily and chips when exposed to high temperatures.

Brick and stone work: Like determining the amount of concrete needed, it is easy to figure the quantity of bricks required, Fig. 22. Fireplace walls should not be less than 8 in. thick. Standard building bricks are 8 in. long, $3\frac{3}{4}$ in. wide and $2\frac{1}{4}$ in. thick. Standard firebricks are 9 in. long, $4\frac{1}{2}$ in. wide and $2\frac{1}{2}$ in. thick. A strong mortar consists of portland cement, 1 part, and sand, 3 parts. If a more "buttery" mortar is desired, replace from 10 to 15 percent of the portland cement of the above mix with hydrated lime. About $\frac{1}{3}$ cu. ft. of mortar is used for each cubic foot of brick-work having $\frac{1}{2}$ -in. joints. Firebricks are laid in fire clay. To start with the brick-work, lay the entire outside row of bricks in place as shown in Fig. 23, allowing about $\frac{1}{2}$ -in. space between the bricks. Generally the spacing can be increased or decreased uniformly so that the course of bricks will



21

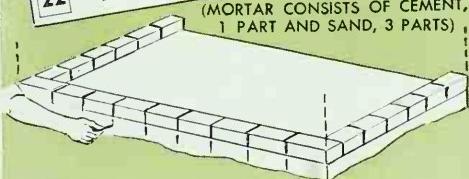
Photo courtesy Louisville Cement Co.

NUMBER OF STANDARD BUILDING
BRICKS ($2\frac{1}{4} \times 3\frac{3}{4} \times 8"$) AND
AMOUNT OF MORTAR USED
IN 1 CU. FT. OF MASONRY
HAVING $\frac{1}{2}$ " JOINTS

| | |
|--------|-------------|
| BRICKS | 17.4 |
| MORTAR | .33 CU. FT. |

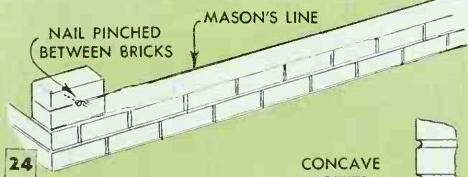
22

(MORTAR CONSISTS OF CEMENT,
1 PART AND SAND, 3 PARTS)



23 SPACING BRICKS TO FIT FOUNDATION

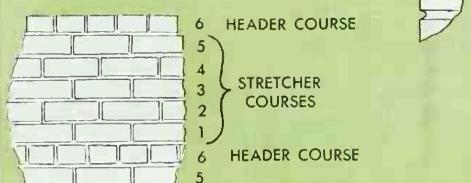
FIRST COURSE LAID TEMPORARILY WITHOUT
MORTAR AND THEN POSITION OF
JOINTS MARKED ON FOUNDATION



24

NAIL PINCHED
BETWEEN BRICKS

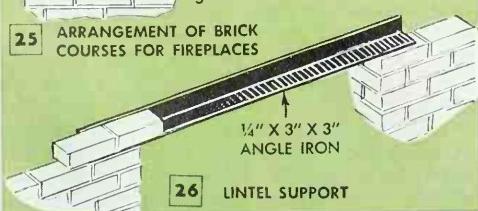
MASON'S LINE



25 ARRANGEMENT OF BRICK COURSES FOR FIREPLACES

CONCAVE
JOINTS

HEADER COURSE
5
4
3
2
1
6
HEADER COURSE
5
STRETCHER
COURSES
2
1
6
HEADER COURSE
5



26

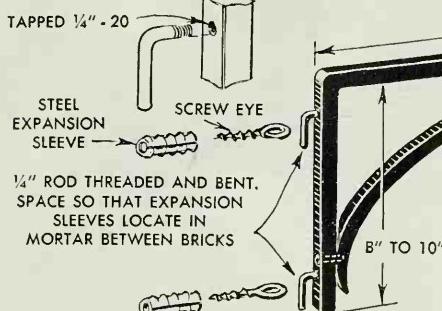
LINTEL SUPPORT

$1\frac{1}{4} \times 3" \times 3"$
ANGLE IRON

fit exactly from corner to corner on the slab. If not, a half brick is set between the last two bricks, or the last brick is laid at right angles, starting the course on the adjacent side. The position of each joint is marked carefully on the foundation. Then the bricks are removed and mortar is applied so that when the bricks are pressed down firmly they will be raised about $\frac{1}{2}$ in. Bricks to be laid must be kept thoroughly soaked so that moisture will not be absorbed from the mortar. A straight line of bricks is assured by using a mason's line stretched taut from two nails pinched between bricks, Fig. 24.

Corners of the brickwork must be kept plumb, which can be checked with a level. The inner bricks of an 8-in. wall are staggered halfway between outer bricks, like those in successive courses. You can use the "common" bond consisting of five courses laid lengthwise and a sixth course laid crosswise to bind inner and outer layers together, Fig. 25. After placing the mortar, the brick is pressed down and also against the mortar on the end of the last brick laid. Simultaneous with these two movements is a third, forcing the brick outward to align its upper edge with the line—not touching it, however. This movement squeezes some mortar out beyond the face of the brick as in Fig. 21. The trowel is used to remove this surplus mortar and to wipe it on the end of the brick just laid. After a course is laid, the mortar joint is raked to a concave shape with the aid of a raking tool or metal rod. This type of joint, shown in Fig. 25, is best for brickwork exposed to weather.

When working with bricks, remember that they are slightly wedge shaped. The top is wider than the bottom, which has a depression or is marked with a trade name, and one face of common brick is square but the opposite face has a slight bevel. Bricks are laid so the face having the depression or trade name is at the bottom and the true face is exposed on the outside of the wall. The first course of brick or stone over a fireplace lintel is given adequate support with a length of $1\frac{1}{4} \times 3 \times 3$ -in. angle iron as in Fig. 26. When using stone for outdoor fireplaces, keep it wet when laying it in mortar, as is done with brick. Limestone, which is relatively soft, is a favorite material, but harder and denser stone will last longer under all kinds of weathering conditions and intense fire heat. Select only pieces of stone that are solid and have no cracks. A stone wall, like one built of bricks, must have bonding stones here and there to keep the separate layers together.

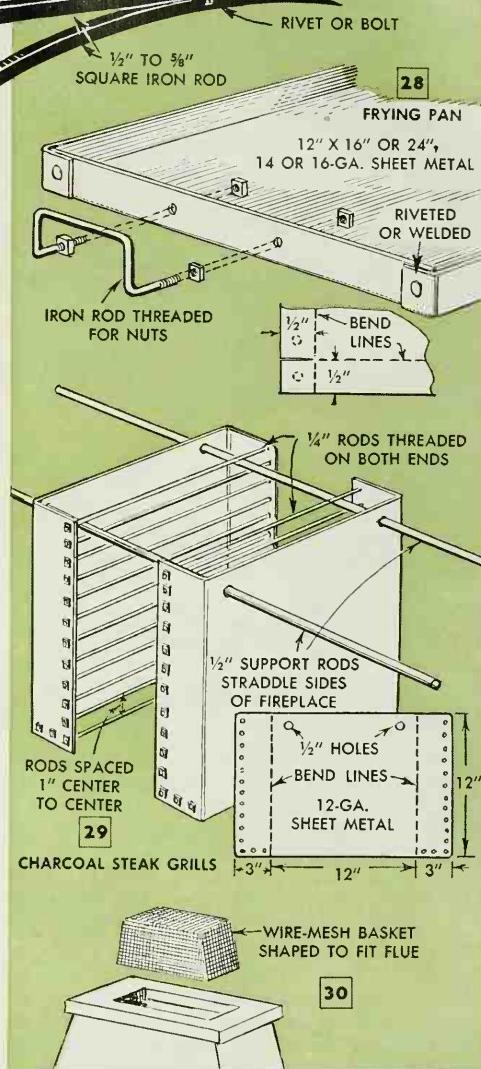
27 PIVOTED FIREPLACE CRANE

Stones can be chipped to shape and size by using a cold chisel and sledge hammer.

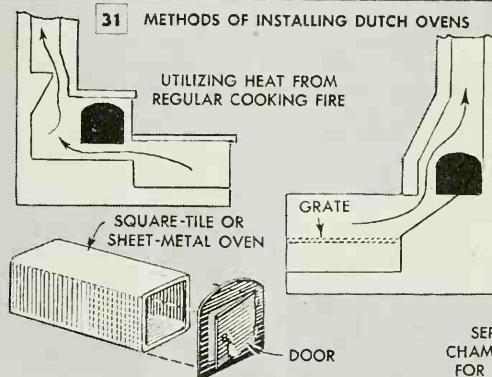
Added conveniences: A solid plate over the grate is often desired to avoid getting utensils coated with soot and getting fly ash in the food. Such a plate should be $\frac{1}{4}$ in. thick. It may be loose or hinged to swing back against the chimney. Food can be prepared in an iron kettle hung on a crane, Fig. 27, and another convenience is a shallow frying pan, Fig. 28. Two charcoal baskets, hanging vertically in a fireplace from two $\frac{1}{2}$ -in. iron rods resting on the fireplace sides, are ideal for broiling steaks. You can purchase these or improvise a pair as shown in Fig. 29.

Three methods of installing a Dutch oven are shown in Fig. 31. To avoid starting a fire on your neighbor's shingle roof or in a patch of dry grass, install a wire-mesh guard on top of the chimney flue as shown in Fig. 30. It's a good idea to provide space for fuel so that it can be kept dry and always ready for use. Such space can be had by incorporating a fuel compartment in the fireplace when designing it. Dishes and utensils can be kept in a Dutch oven although separate storage space can be provided if desired. Scrupulous cleanliness is of utmost importance because scraps of food attract insects and rodents.

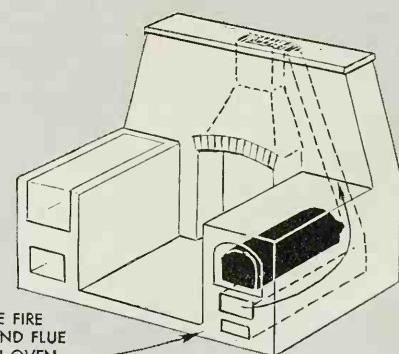
HALF OF FIREPLACE WIDTH

**31** METHODS OF INSTALLING DUTCH OVENS

UTILIZING HEAT FROM
REGULAR COOKING FIRE



SQUARE-TILE OR
SHEET-METAL OVEN
DOOR
GRATE
SEPARATE FIRE
CHAMBER AND FLUE
FOR DUTCH OVEN





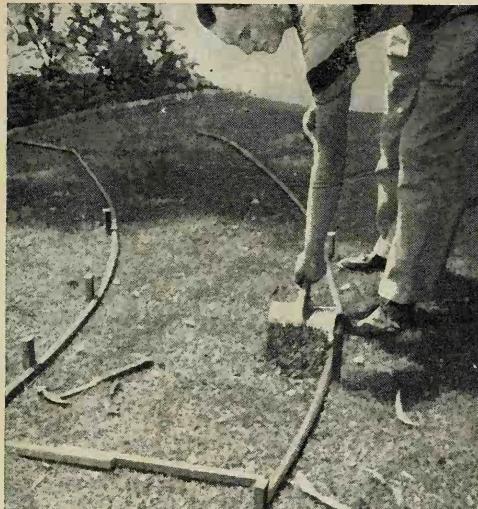
Pour Your Own

FLAGSTONE WALK

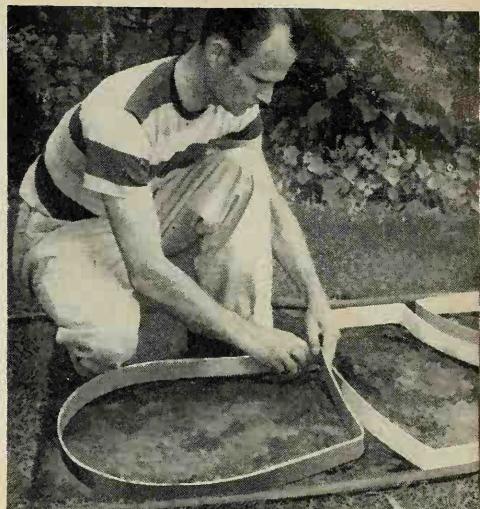
WHY PAY OUT a lot of money for flagstones when you can cast them realistically in concrete? It requires no special skill. A trowel and a shovel are the principal tools needed and the work is actually fun. The series of photos on the opposite page take you through the steps involved and illustrate convincingly what a simple job it is. The "stones" are cast right in place, using metal molds resembling large cookie cutters. The molds are bands of sheet metal which are bent into irregular shapes to closely resemble actual flagstones. These are fitted together like the pieces of a puzzle, being spaced about 2 in. apart and held in position with dampened soil. After each stone has been cast and allowed to set 24 hrs., the molds are removed and reused. The first thing to do is to lay out the width and desired curve of the walk, using a garden hose to establish its outline. Small stakes are driven along the outside of the hose and used to guide the placing of the molds. If a lawn already exists where the walk is to be located, the sod is removed to a depth of about 1½ in. Take out only enough sod to accommodate the number of stones to be laid at one time. In this way, the walk can be built in stages

to suit your spare time without having the lawn torn up. The molds consist of sheet-metal strips 2½ in. wide and 5 or 6 ft. long. The ends of each mold are wired together through holes punched in the metal with a nail. Keep the molds large and varied in shape, no two being alike nor smaller than 1½ ft. across.

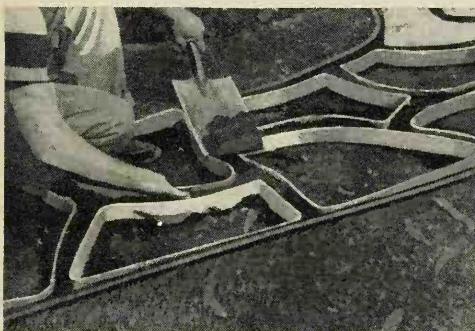
A 1-2-3 mix is recommended for the concrete fill, that is, one measure of portland cement, two of sand and three of pea gravel. Tamp the concrete firmly in the molds so that it puddles at the top and then rake off any surplus flush with the top of the molds, using the edge of a straight board. A little crown is preferred in troweling the stones so that they will shed water. Avoid using an edging tool around the outer edges of the molds. It is better to let the mold chip the edge of the concrete as it is removed so that it resembles a regular hand-cut flagstone. The molds usually can be removed the following day by merely cutting the wires that hold them together. After the metal bands have been pulled free, some of the dirt is scooped out from between the stones and replaced with strips of sod, keeping the latter lower than the tops of the stones.



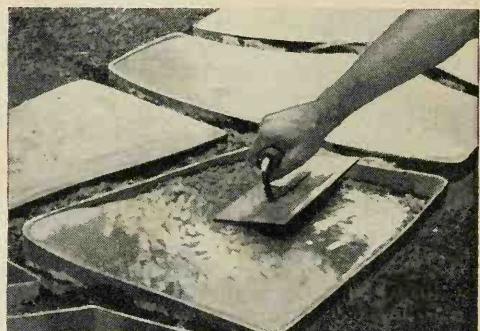
1st. A garden hose is used to establish the outline of the walk. This is staked in position and then the sod is removed, some of which is saved for filling in around the flagstones after the molds are removed



2nd. The sheet-metal bands which form the molds are made "endless" and then bent into irregular shapes, no two being alike. The ends of the bands are wired together and molds are placed as desired 2 in. apart

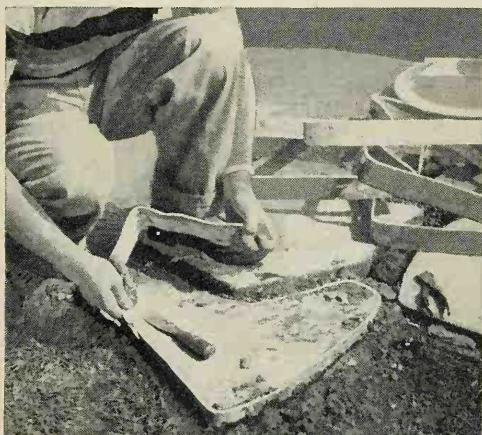


3rd. Wet soil is used to hold the molds in position. Part of this is later removed and replaced with sod



4th. Molds are filled level with concrete, tamped and troweled. Straightedge is used to rake off excess

5th. Removal of the sheet-metal molds is easy. Just cut the wire holding the ends and jerk the strip free



FENCES FRAME THE HOUSE

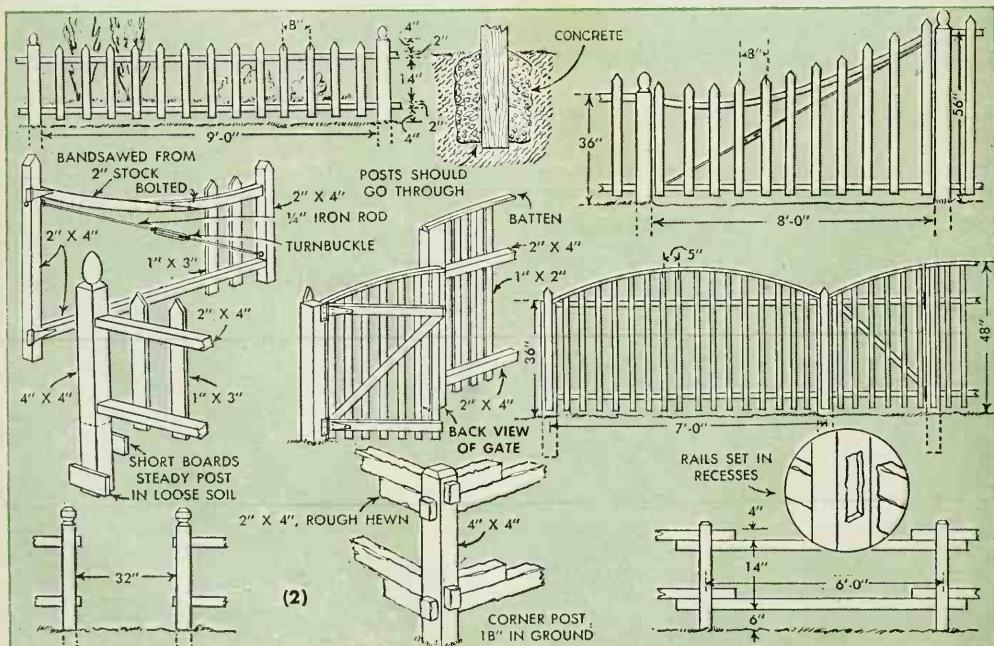


A FENCE does for the house what a frame does for a picture. It bounds the area, and just as a frame may add to or detract from a picture, so may the fence do much to improve or impair the appearance of a house. The style chosen should blend with the general architecture. To use extreme examples, a Georgian house would not look well with a split-rail fence, nor would a log cabin appear natural surrounded by a brick wall. Figs. 1 and 3 show good examples of fences blending in with architecture of the houses they surround.

When building a fence, the posts should be spaced an even number of feet apart; 6, 8 or 10 feet. The reason for this is that the 2 x 4-in. lumber that forms the top and bottom rails of most fences comes sawed in such lengths, or multiples of these dimen-

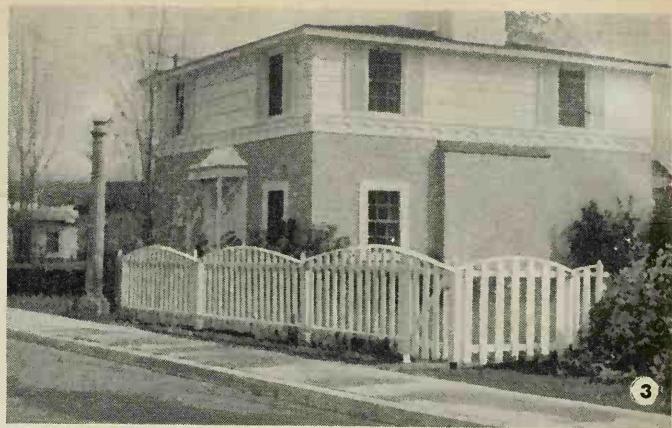
sions, and can be cut without waste. But if the design is best with the posts spaced an odd number of feet, as shown in the details of Fig. 2, a 7-ft. length can be cut from a 14-ft. piece and a 9-ft. span cut from 10-ft. stock without much waste due to the lap past the posts.

Fig. 1 shows certain variations in the design of fencing which has been adapted to the setting. The fence has been especially designed and located to complement structural details of the house. Fig. 3 shows how one fencing problem has been worked out with the architecture of the house and the boundaries of the property in mind. To break up the geometric pattern formed by the vertical and horizontal lines of both the picket fence and the house, tops of the pickets have been cut and fitted on a radius

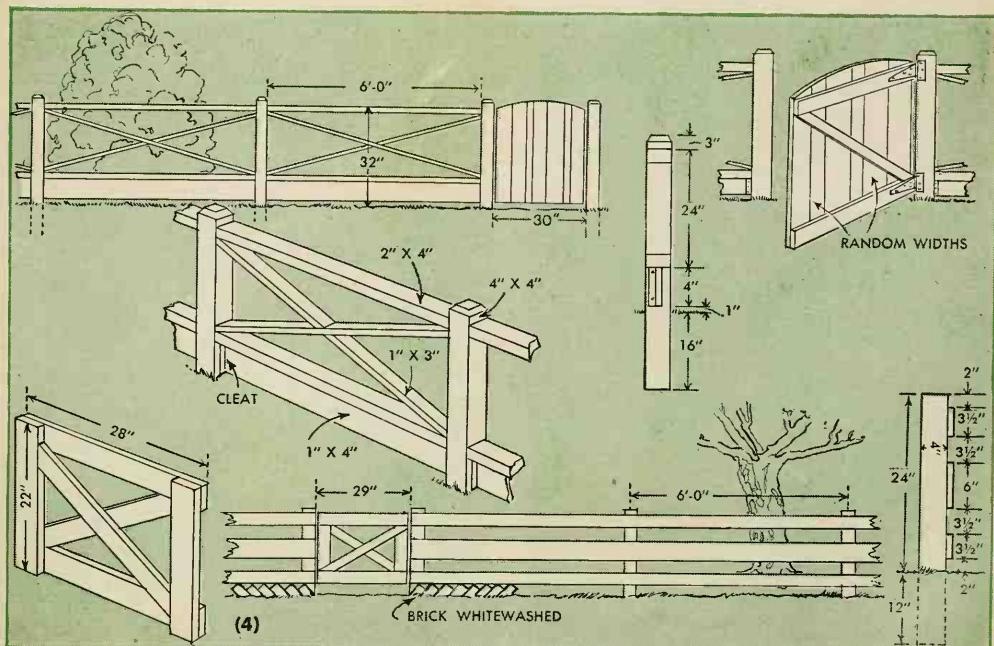


and the regular curve thus formed is further accentuated by nailing a thin wood strip over the curved ends. The gate in this particular fence is so constructed that it forms part of the major curve, as you can see from the photo and the detail in Fig. 4. Thus the long sweep of the curved strip has the effect of lengthening the spans between the posts and makes the area enclosed appear larger.

In building fences of the types pictured and detailed, the selection of suitable materials and fastenings is quite important. Posts should be of enduring woods such as red cedar or oak, and the boards, pickets and rails may be of cedar, white pine or cypress. Either rough-sawed or surfaced boards can be used, although those of the former grade are much more difficult to paint. In setting posts permanently, first creosote the lower ends up to the ground line and then set in concrete, making sure that the lower ends project. Fasteners, such as nails, screws, bolts, hinges and hooks, used in assembling any of the fences shown should be zinc-coated or otherwise made rust-resistant. In any case, always use coated nails as they not only resist rust for long periods but hold much better in soft woods. Unless colors are demanded by some special outdoor



decorative scheme, fences are commonly painted white, using an outside lead-and-oil paint, or are stained with creosote which also acts as a preservative. The fence will be much more enduring if you take the time to apply paint to the surfaces of all joining parts. If you assemble the fence first and then paint it you leave a portion of the surfaces unprotected. Moisture works into the joints and is absorbed through the uncoated wood. This causes swelling, loosening of the nails and eventual checking and decay. The best way is to prime the wood and then apply the priming coat to the joining surfaces as you assemble the parts. It's advisable to do this when finishing with either lead-and-oil paint or creosote. The primer should be thoroughly dry before applying a second coat.



ARBORS FOR YOUR ENTRANCE GATES



The arched trellis above is conventional in itself but the privet hedge turns it into a novel gateway

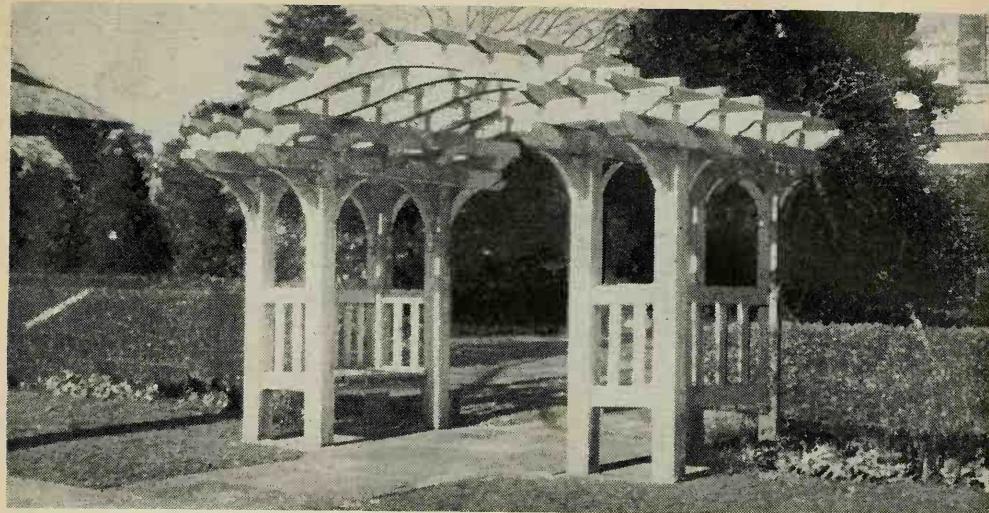
A RBOR-FRAMED GATES and pergolas such as these will enhance the beauty of the grounds around your home. Regardless of the size of your property, they will add interest to an otherwise plain entrance and afford the opportunity to grow climbing vines and other plants that would be impossible to train without them. These photos show several of an unlimited number of designs that can be built by anyone with a few hand tools, and you can make them just as simple or as pretentious as you wish from standard stock.

The conventional arched trellis (shown on this page), over which a privet hedge has been trained to grow, is an appealing gateway. However, it will take several years for a hedge to attain the symmetry of the one in the photo. The large arbor pictured at the top on the next page has seats on either side and a heavy lattice-work roof which adds a note of dignity to more spacious grounds. Two buggy wheels painted white and securely mounted on each side of a driveway add a novel touch to a white picket gate between them. The carriage lamps hung from lengths of pipe are in

keeping with the theme of the arrangement.

Another type of arbor shown is one made from strips of regular lattice stock, some of which have been bent U-shape and attached to short posts to form a framework for strips applied horizontally. When vines or climbing roses cover it, this ornamental arbor will shade the walk. In most cases, the strips can be bowed dry, but if the curve is of small radius, the strips can be made more pliable by soaking them in water for several hours and bending them while they are wet.

Since these arbors and pergolas are of a semipermanent nature, use the best weather-resistant wood available for their construction. Redwood, western red cedar and cypress are especially suited to this purpose. These woods are durable, take paint well and are easy to work. If they are not available, white pine or other regular lumberyard stock will do, provided it is kept well painted. Ample protection over a period of years can be had by applying three coats of any good outside paint or two coats of creosote stain. Paint all parts with a priming coat before they



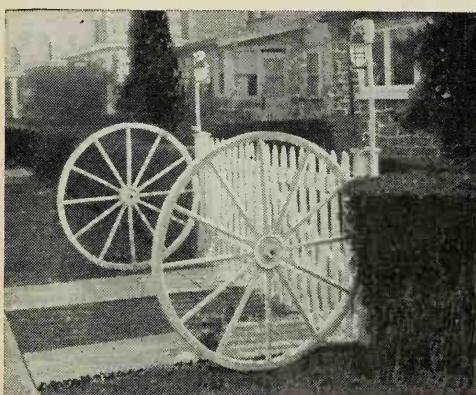
The large arbor with a heavy lattice-work roof, as shown above, adds dignity to grounds that are spacious

are assembled. Before nailing the pieces together, coat all of the adjoining surfaces with white-lead paste to prevent dry rot.

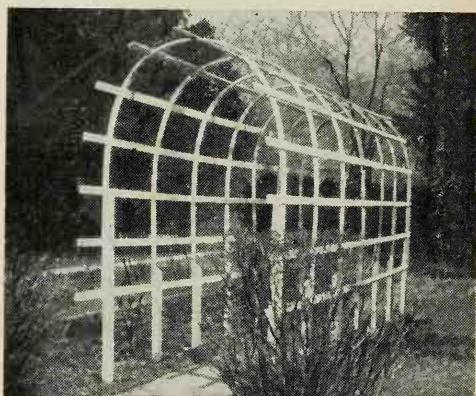
Set the supporting posts at least 24 in. into the ground. The portion of the post that will be below ground should be tarred or creosoted. To do this, soak the posts in creosote for several hours, and have the solution in a can deep enough so that the coated portion of the posts will reach 5 or 6 in. above the ground after they are in place. It is advisable to set all the posts, especially large ones, in concrete. Dig a hole several inches wider than the post and about 4 in. deeper than the distance the post is to be set below the ground. After the posts are set in the holes, plumb them and tamp the concrete well around them. When the concrete has cured, sometimes a small opening around the post will appear

due to shrinkage. It is likely that water will seep into these openings, so seal them with oakum or roofing cement. One way to anchor a post securely in concrete is to drill a hole through it near the lower end, and insert a piece of broomstick or metal rod crosswise so that it projects 3 or 4 in. on each side. This will key the post securely.

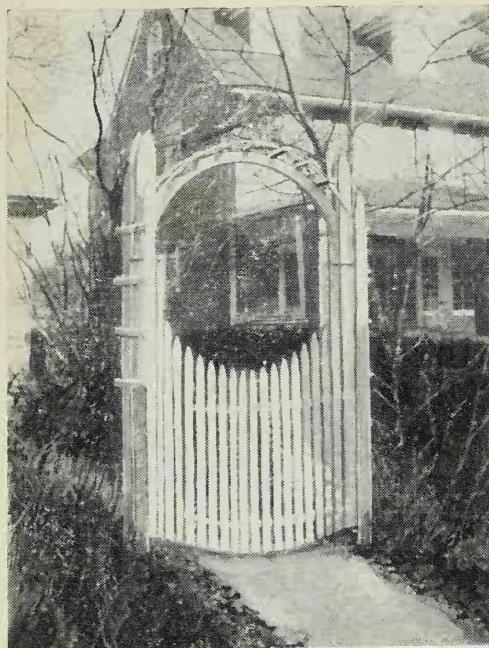
A more natural arbor than those shown here can be had by planting a few trees in a straight row and at regular intervals, with the tops cut off at the desired height. Vines are then trained to grow around the trunks and weave up into the branches of the trees. Whatever type of arbor you construct, the aim should be towards simplicity. By all means avoid conspicuous and overpowering structures. Always keep in mind that the primary purpose of an arbor is to provide shelter, and vines help toward this.



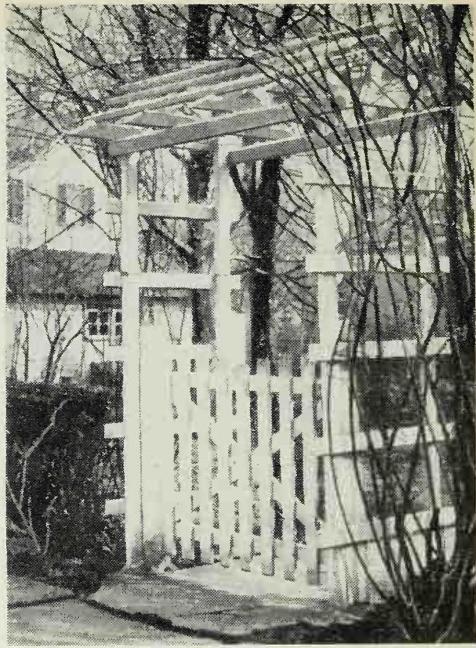
Two buggy wheels on either side of a driveway add interest to the white picket gate which is between them



This arbor is made from strips of regular lattice stock which has been bent to an inverted U-shape



Trellis, with semicircular roof, and picket gate form interesting oval frame. Note how the tops of the supporting posts are pointed. Short strips of lattice stock are fastened horizontally to the posts and arch

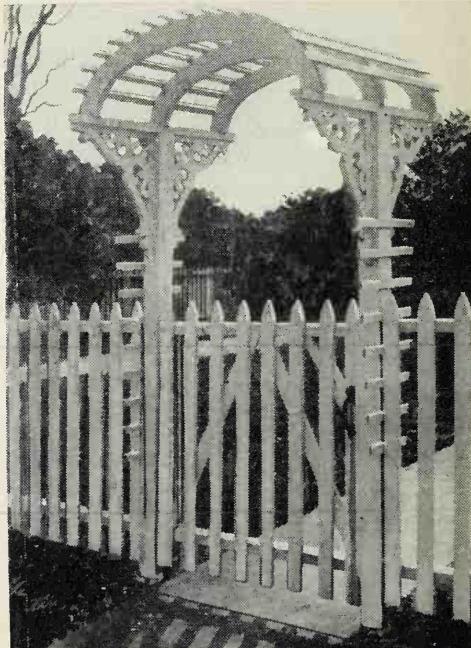


Sturdily constructed pergola with gable-type lattice roof makes a gateway that blends well with the wooded surroundings. Set in concrete and kept properly painted, it will remain an attraction for years

Pleasing arched entrance through the high, thick hedge is effected by this trellis along with a gate of unusual design. Use of vertical slats on arches and sides presents a distinctive, unique appearance



Ornamental arbor sets off entrance way in neat picket fence. Scrollwork near top of supporting pillars lends delicate touch, and horizontal lattice on posts provides trellis for vines or climbing roses

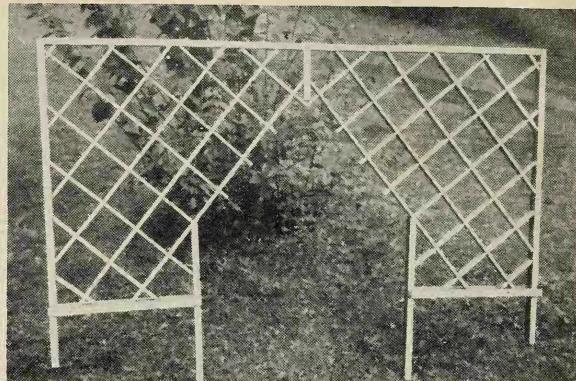


GARDEN TRELLISES YOU CAN MAKE

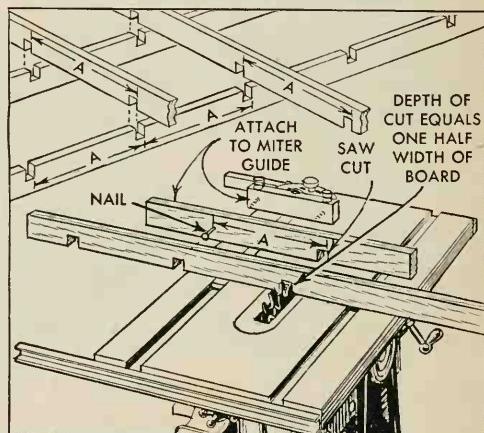
IF CLIMBING plants are to fit into the scheme of your garden, you will by all means need a trellis or two. There are also those fancy types of trellises which are made up of highly intricate designs and are kept free of plants to become ornaments in themselves. However, this latter type of trellis is not too common in the average American garden. Such decorations have little if any practical value in a home garden and often detract rather than add to the beauty of the home grounds. A good rule to follow in erecting a trellis is to make it subdued rather than striking. A trellis should fulfill its function as an accompaniment and aid the desirable vegetation.

The basic form of trellis work consists of narrow strips of wood nailed in vertical and horizontal positions on a framework of heavier wood. The spaces between the parallel laths are usually equal to the strips themselves. Here is where your originality can be used to get away from the monotony of this basic design. You can make use of such ordinary things as clothes hangers, wagon wheels and even an old porch gate to construct interesting and useful trellises. Explanations as to how this can be done are included on the next page.

The basic crisscross pattern is used with certain variations in the trellis shown in the upper right-hand corner of this page. This trellis is easy to make with half-lapped joints if the miter-guide jig which appears in the detail is used to space the notches uniformly. The notches preferably are made with a dado saw, but they also can be cut with an ordinary saw blade. The notches, of course, must be the same width as the thickness of the stock and as deep as one half its width. Standard lattice stock is used for the grillwork of the trellis which, when assembled is framed with 1 x 2-in. pieces. First, notch a short length of stock and drive a nail into it as indicated, distance A being equal to the distance the notches are to be spaced. Then screw this strip to the miter guide on the saw table. To cut the notches with a dado saw, make the first one near the end of the strip, and using the jig with the nail as a stop pin, proceed to cut each succeeding notch. Approximately the same method is used with a saw blade, except that the notches are made by holding one side of the preceding notch against the nail and making repeated cuts until the other side of the notch contacts the nail. By adjusting the miter guide,



The trellis above is a variation in the ordinary crisscross pattern. The detail below shows specifically how it is made



Here is a portable trellis which can be moved easily to meet the shade or sun requirements of a plant



Coat hangers can be put to good use to make a trellis

angle cuts also can be made in this way to obtain a diamond-shaped pattern. After notching the strips, cut them to length and assemble the trellis with brads in the usual manner by driving them through the center of the half-lapped joints. Before nailing each joint, apply white lead to the meeting faces to prevent dry rot. The trellis is supported by two center stakes, the ends of which are preserved by dipping in creosote.

A very convenient kind of a trellis to have in your garden is a portable one, like the one in the lower right-hand corner of the preceding page. This trellis can be moved easily to meet the sun or shade requirements of any particular plant. If you wish to grow a certain ivy or climbing rose which must have shade, it's a simple matter to set up the trellis in a shaded spot and vice versa for plants requiring sun. The trellis is made by casting concrete blocks around pipe sockets in which the uprights are inserted. If cylindrical-shaped concrete blocks are used, they may be rolled from place to place in the yard.

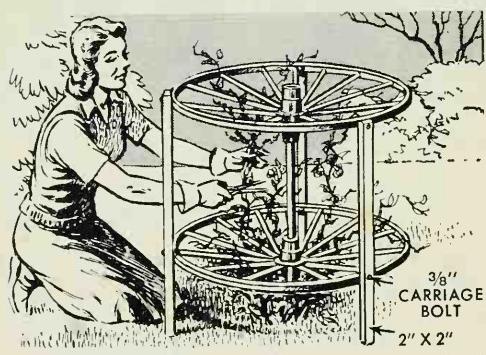
Now let's discuss those trellises that can be made from coat hangers, wagon wheels and an old porch gate. A trellis made of ordinary wooden coat hangers is about the simplest kind you can make. For half the job is already done before you have even lifted a finger. All you have to do is nail the coat hangers across three uprights of

lath or lattice stock, give the trellis two coats of paint and, when dry, embed the ends of the uprights in the ground.

If you happen to have a couple of old wagon wheels available, you can make good use of them in the construction of a trellis. The wheels are merely mounted horizontally, one on top of the other, supported with three 2 x 2-in. stakes spaced evenly around the edges, attaching the wheels to the stakes with $\frac{3}{8}$ -in. carriage bolts.

That old porch gate that has been lying around may also come in handy to provide an attractive flower trellis. The gate is extended to the desired height and attached with screws to a post or the side of a building so it is easily removed. If set up against a building, use wooden spacers to hold it away from the siding. The wonderful thing about this trellis is that it can be folded and stored away during the winter.

There are probably numerous other objects around the home that can be converted into a trellis. You do not have to be a master craftsman to work on such a project. Just look around and see if there are any odd pieces that can be converted into a trellis. Let your imagination have a free rein. You might be surprised at the results.



A trellis can also be made by mounting wagon wheels



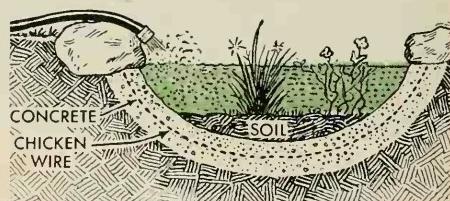
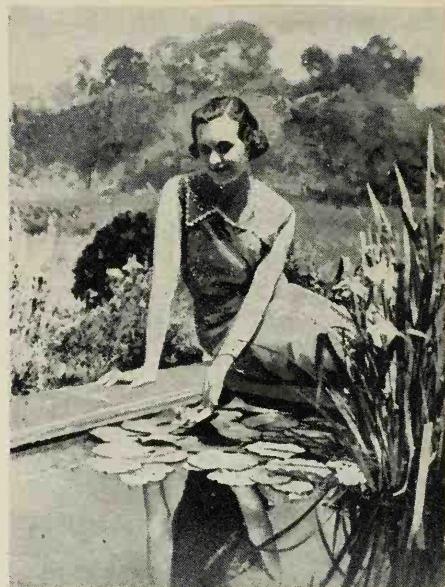
An old garden gate was used to make the trellis above

A QUIET POOL FOR YOUR GARDEN

An informal pool and rock garden are one of the easiest and least expensive methods of improving your home grounds, and you get immediate results—there's no expensive grading, dirt moving or waiting one or more years for grass, trees or shrubs to develop. Just scoop out a shallow depression in the ground and pour some concrete. Then place a few rocks and set out appropriate flowers and plants. You can do all the work yourself, and the pool can be as elaborate as you wish. The photograph at the right shows a small, plain pool, which is very attractive with the appropriate plants growing in and around it. If you have spacious grounds, you could probably accommodate a larger and more formal pool.

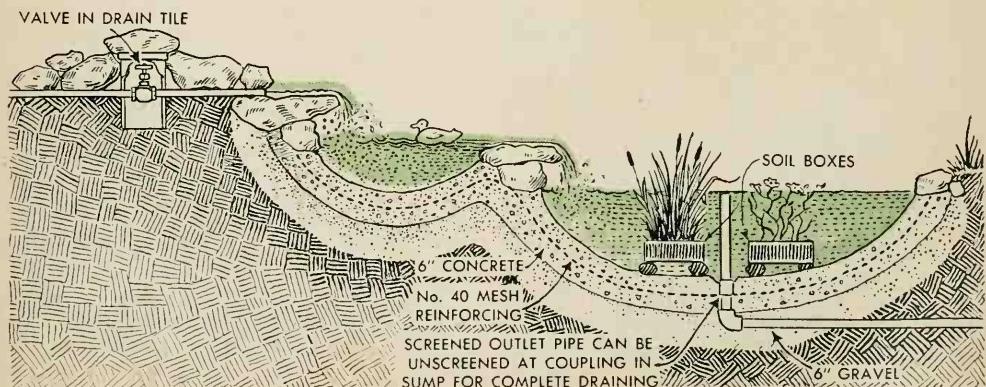
Strong, watertight concrete is made easily. Most important is the amount of water used per sack of cement, ranging from $4\frac{1}{2}$ to 5 gals., depending on the moisture content of the aggregate. The correct mix should be plastic enough to hold its shape well, but not crumbly. Average proportions are cement, 1 part, clean, sharp sand, 2 parts, and gravel, $2\frac{1}{2}$ to 3 parts. Do not permit newly placed concrete to dry out fast. Protect it for a week or ten days. A covering of burlap or canvas, sprinkled often enough to keep it moist, should be used while the concrete is curing.

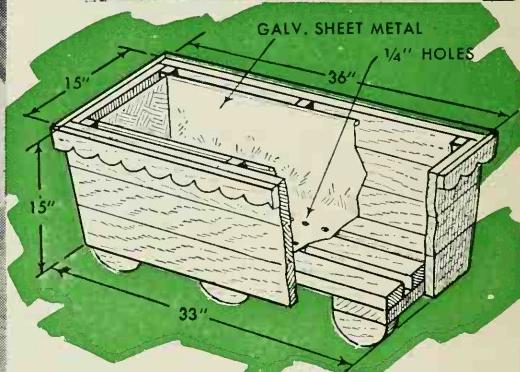
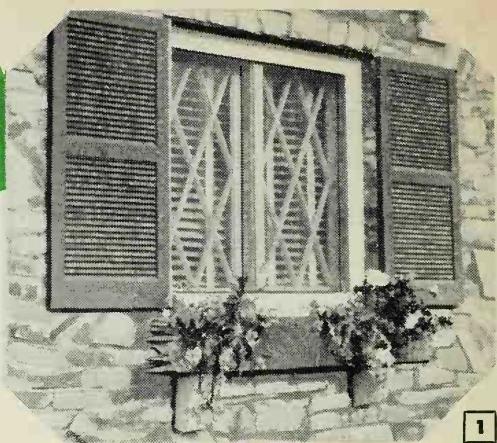
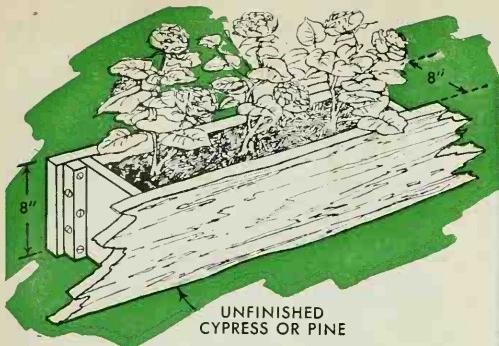
The detail at the bottom of the page illustrates a pool with a waterfall. If your backyard slopes, this is an excellent treatment. A simpler pool is shown in the detail at the right. For convenience in cleaning, soil for the plants should be put in boxes. These should contain a generous amount of stable manure mixed with the soil. A drain pipe is laid before pouring concrete over the bed of cinders or gravel, the latter being used for drainage and also as a cushion in any heaving due to frost. Recommended reinforcement for pools is 40-lb. steel mesh, but if not available, you can use old hog or chicken wire, expanded metal lath or similar material. Concrete in smaller pools is 4 in. instead of 6 in. thick, and is poured directly



into the excavation without cinders or gravel underneath. All pools should be on high ground if possible, to facilitate draining and prevent heavy rains from washing litter into them.

To maintain the charm and beauty of a garden pool, keep it cleared of debris as much as possible. An ordinary broom can be used to fish out the litter.





WINDOW-SILL GARDENS

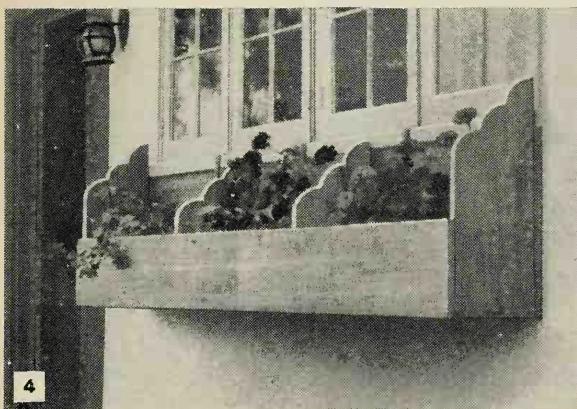
HANGING gardens placed at the window-sill level are of immense decorative value to both the interior and exterior of any home. Foliage and flowering plants, certain dwarf shrubs, evergreens, potted slips, succulents and even trailing vines can be grown in a window-sill garden, and they will thrive with a minimum of care. Some varieties grow best in full sunlight; others do well in partial shade, and some in full shade. This means that, by carefully selecting the plants, you can grow luxuriant hanging gardens on all four sides of the house in a single season. Groups of plants selected for a given location should have the same or similar soil preferences, and also similar temperature and sunlight requirements. Only low-growing plants with heavy stems and short foliage should be selected for second-floor window gardens, as these will be more directly exposed to high winds and beating rains. If shelves are used at the second-story windows, holes should be scrollsawed in the shelf boards so that the plant pots can be set in the holes to about half their depth.

This arrangement prevents the potted plants from being blown off the shelves. If soil is to be placed directly in the box, the latter should be made of wood with a removable metal lining of zinc or aluminum. Cypress is the most durable wood, with redwood and pine a second choice. The selection and preparation of soils are important. As the amount of soil is limited by the size of the box, the plant food of an ordinary soil will soon be depleted. A good mixture for window boxes is composed of dark garden loam, rotted leaf mold and sand in the proportions of 2 parts loam, 1 part leaf mold and 1 part sand. After these components are mixed, a complete fertilizer is added. Then the whole mass is mixed thoroughly and sifted through a $\frac{1}{2}$ -in.-mesh screen. To grow most varieties of succulents, proportions of the soil mixture should be 2 parts loam to 1 part coarse sand, no leaf mold being used.

In preparing the window box for planting, $\frac{1}{2}$ -in. drainage holes are drilled in the bottom in an over-all pattern measuring about 3 in. each way. Small pieces of



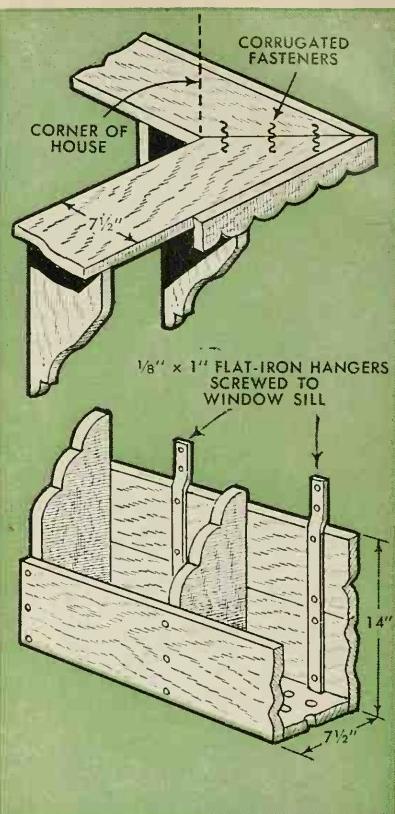
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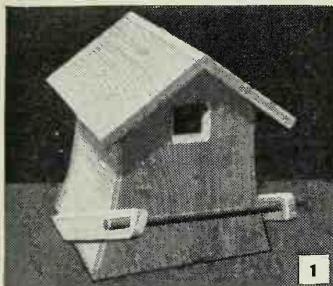
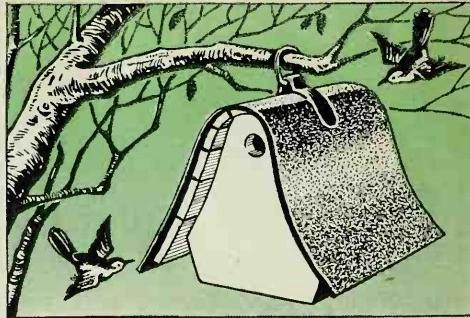
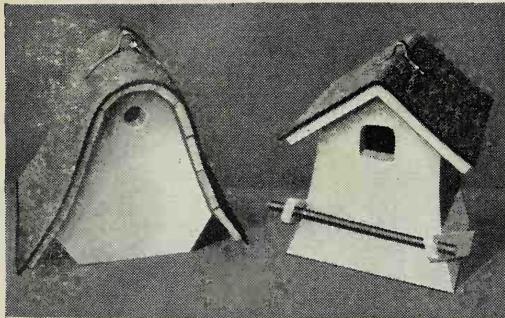
broken pottery (pieces from a flowerpot will do) are placed over each of the holes to keep fine material from sifting through. Then a 1-in. layer of coarse gravel, cinders or small pieces of broken pottery is placed in the bottom of the box. If the box is to be planted with succulents, the layer of this material should be 2 in. thick. Fill the box with the soil mixture to within about $\frac{1}{2}$ in. of the top, pressing it down firmly. The mixture should be dry enough to handle easily without sticking to the fingers.

Plants to be grown in such a confined space as the average window box should be selected for type and habits of growth. Foliage plants with large individual leaves should not be planted adjacent to small, low-growing plants, except in extra-long boxes where the large plants can be placed at the ends of the box or in the center. If planted at random or alternately in a smaller box, the large leaves of the taller foliage plant will shade the smaller plants during some part of the day and may thus affect the rate and extent of growth. As a result of spreading root systems, large and vigorous growers also will rob small plants of needed soil fertility. Window-box gardeners generally select low-growing flowering plants for the sunny side, foliage



plants and trailing vines for the areas of partial and full shade and small evergreens for the year-round window garden. Suitable evergreens may be any of the low, spreading varieties which grow slowly. Certain plants that will not mature fully in the shorter growing seasons of the colder regions are suitable for outside plantings only in the warmer climates.

Most window-box plantings must be sprayed or dusted regularly to keep off insects and prevent disease. Spray solutions can be applied with a syringe, and prepared dusts with an applicator usually furnished with the product. As a rule, only annuals are planted in outside window boxes in temperate regions. In most cases, potted plants placed in or on window boxes or shelves are taken inside during the colder months. This simplifies the insect and disease-control problem, at least to some extent. Plantings of evergreens that are well established will flourish the year 'round in exposed locations if they are properly cared for during the summer and are thoroughly watered just before the coming of freezing temperatures. At this time, a thorough watering is especially important for if the soil freezes "dry" the plants are likely to die.

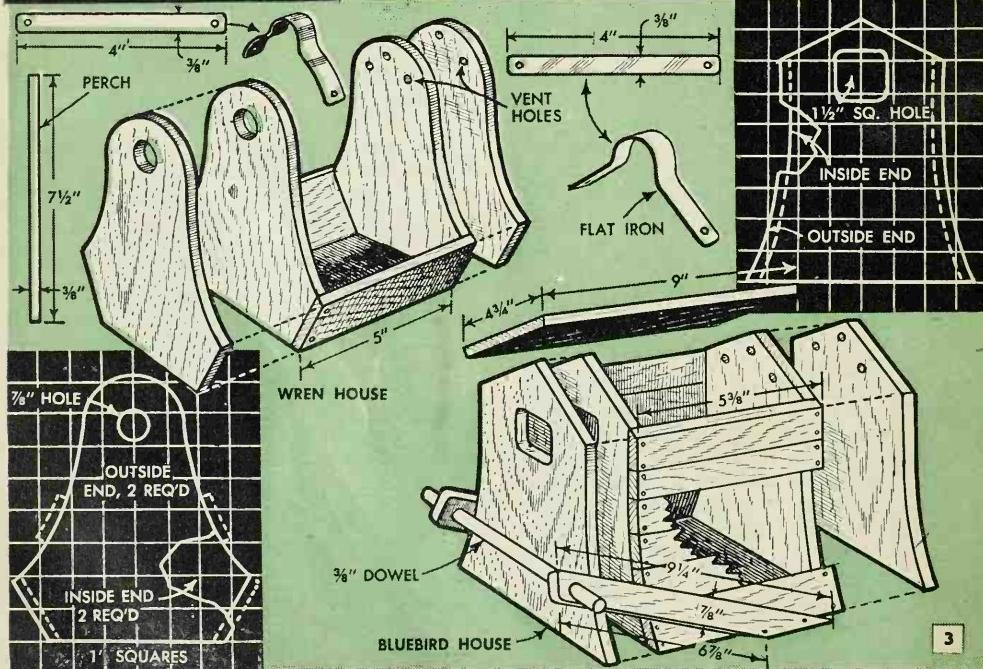
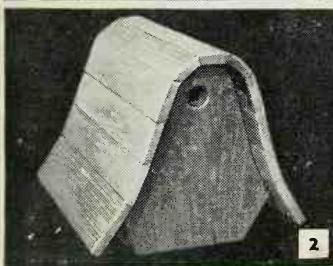


OUR FEATHERED FRIENDS NEED HOUSES TOO

BOTH the bluebird house, Fig. 1, and the wren house, Fig. 2, can be constructed easily from almost any $\frac{3}{8}$ -in. scrap lumber. Packing-box material is especially suitable for this purpose, but as it is surfaced only on one side, build the houses so that the smooth side is on the exterior. Assembly of both designs is indicated in Fig. 3. Double the front and back pieces, making the outer ones larger to cover the ends of the siding. Jigsaw duplicate parts to obtain identical shapes. The perch on the bluebird house is a dowel, mounted as shown. After setting the nails, fill the holes with putty, allow it to dry and then sand the surface. Apply two coats of outside paint, and cover the roof with pieces of asphalt shingle fastened with nails or roofing cement.

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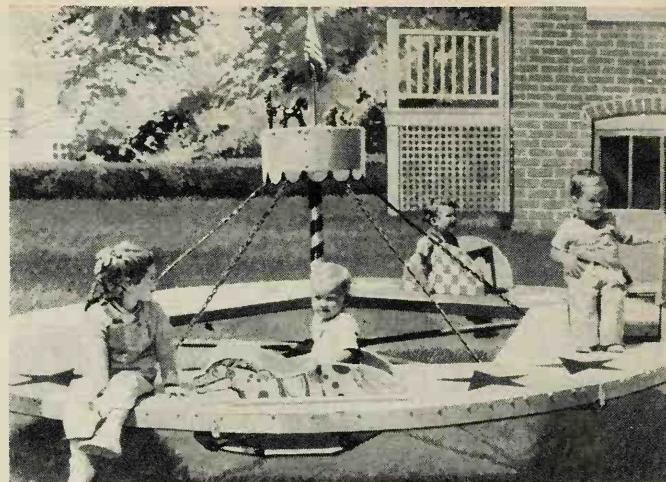
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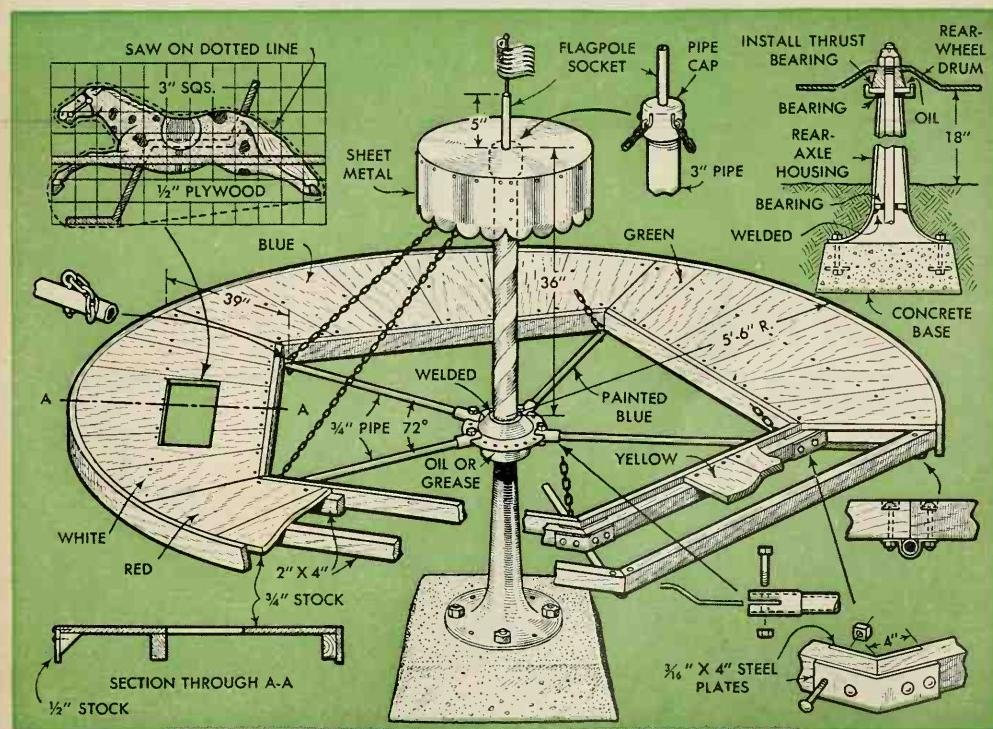
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Back Yard Merry-Go-Round for Children

Safe and sturdy, this back yard merry-go-round provides ideal amusement for children too small to play the rougher games of older children. Details of construction given here need not be followed exactly since they will depend upon the materials that can be obtained. The pedestal and spindle assembly on which the merry-go-round turns is the rear axle and housing from a car, cut down and bolted to a concrete base as shown in the upper right-hand detail. The same detail indicates the mounting for the rear-wheel drum. After completing this part of the assembly, weld a 36-in. length of 3-in. pipe to the top of the drum and screw on a pipe cap. Then weld the flagpole socket to the cap. The lengths of pipe that serve as struts to connect the pedestal to the wooden platform are cut and assembled as shown in the center and lower right-hand details. Finally, attach



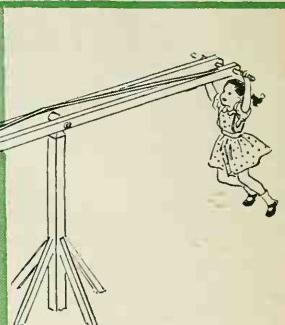
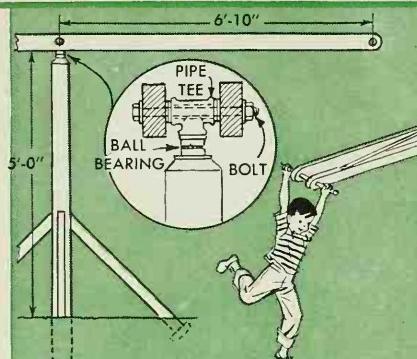
chain braces to the struts and pipe cap, and weld the sheet-metal canopy in place. Seats for the merry-go-round can be of a size and design to suit the age of the children. A pattern for a pinto pony is given in the upper left-hand detail, and the top photograph suggests a few other types. Finish the merry-go-round with gaily colored enamels.



SEESAWS NEED NOT ALL BE ALIKE

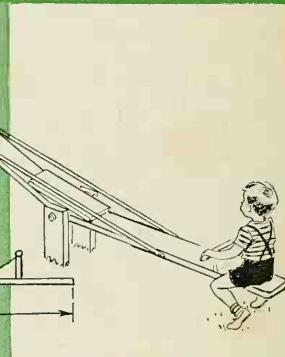
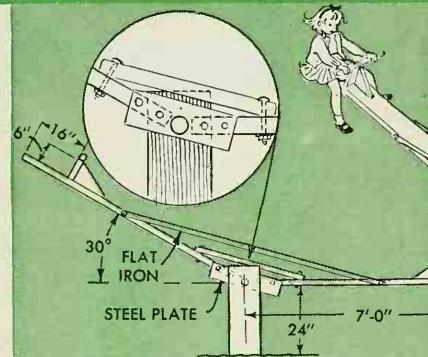
AERIAL

That's right. They needn't all be alike. They can have considerable variety. Here, for example, are four types, plus as many different kinds of fun. The first one, right, swings on a universal joint, that is, it can go up and down and around at the same time. One lad and a companion each grab an end. The lightweight really gets a ride 'round and 'round and up, too



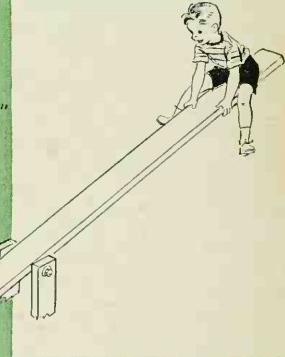
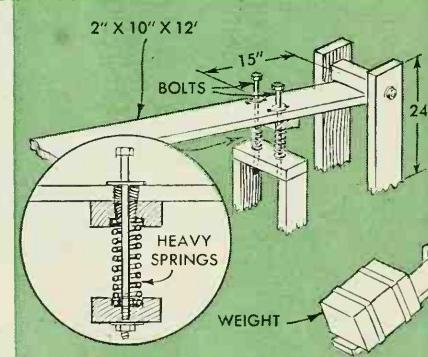
HIGH-LIFT

Then there's this version. The upgoing passenger may feel as if he's about to take off from a springboard but that's okay. If he hangs onto the sturdy handles provided he'll come down again. So will the other fellow when his turn comes. Detail drawing shows how it's made, in a sort of cantilever style. Posts should be anchored firmly in solid ground or concrete



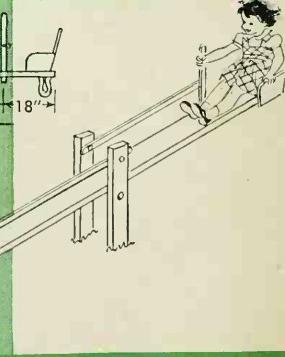
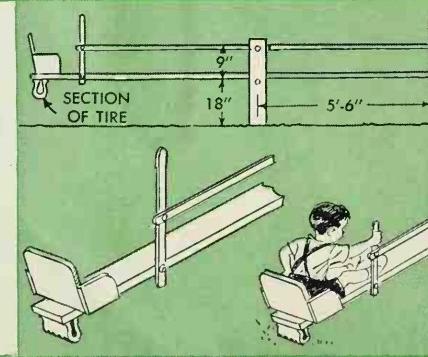
SOLO

These two are designed exclusively for solo flights. On one the dummy passenger is a box of sand. Find the right spot on the long end of the board where nice balance is attained and away you go. The other number, shown in the detail, performs much like a springboard. Strong coil springs give the bounce necessary to keep things lively. Parts should be amply strong



LAZY LOUIE

This one's still different. Arms instead of legs supply the motive power. Riders about equally matched in weight sit in bucket seats and make with the hand levers. Sections cut from old tire casings and attached to the plank keep the bumps safe and satisfying. Operating this one by hand actually takes a lot more energy, but the riders never know the difference



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